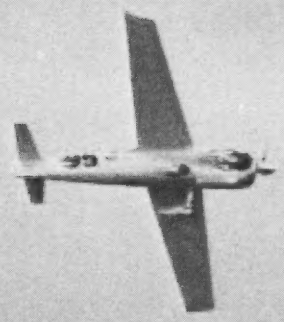
FAA Aviation News
AVIATION SAFETY FROM COVER TO COVER
MAY / JUNE 2007



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FAA TAA Inspector Training

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Federal Aviation Administration

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The FAA's Flight Standards Service, General Aviation and Commercial Division's Plans and Programs Branch (AFS-805) publishes *FAA Aviation News* six times each year in the interest of aviation safety. The magazine promotes safety by discussing current technical, regulatory, and procedural aspects affecting the safe operation and maintenance of aircraft. Although based on current FAA policy and rule interpretations, all material herein is advisory or informational in nature and should not be construed to have regulatory effect.

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The Office of Management and Budget has approved the use of public funds for the printing of *FAA Aviation News*.

GOVERNMENT PRINTING OFFICE (GPO) SUBSCRIPTION SERVICES

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FAN SMITH212J JUN05 R 1 423*
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http://www.faa.gov/news/aviation_news

MAY/JUNE 2007 ISSN: 1057-9648

FAA Aviation News

AVIATION SAFETY FROM COVER TO COVER

VOLUME 46 · NUMBER 3

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BACK COVER: "Gunfighter," a "D" Model P-51 at Midland, Texas. (Raymond Stinchcomb photo).

FAA TAA Inspector Training

story and photos by H. Dean Chamberlain

Test your "glass cockpit flat-panel" knowledge:

1. Which of the following general aviation flat-panel glass cockpit systems' attitude-heading reference systems can be reset in flight?

a. Garmin G1000™
b. Avidyne Entegra
c. Chelton Flight Systems
d. All of the above

2. Should you pull circuit breakers in the Cessna Garmin G1000™ equipped C-172 aircraft to simulate an equipment failure?

a. Yes
b. No
c. Depends

3. What is the significance of the color magenta when using the Garmin G1000™ system?

a. The VOR is the active navigation source
b. The system has failed
c. The GPS is the active navigation source
d. It is the default color

Answers at the end of the article.

If you don't know the answers, put yourself in the position of an FAA general aviation operations aviation safety inspector (GA OPS ASI) when pilots call and want you to give them practical tests in their new "flat-panel glass cockpit" general aviation (GA) aircraft. These may be new aircraft cockpits that the inspector may know little or nothing about.

That was the problem facing the FAA. So what do you do when you have a large aviation workforce and GA technology is changing rapidly? If you are the FAA's Flight Standards Service, you have to change to keep up with the technology or lose credibility with those you serve.

Such was the case facing some of the FAA's general aviation operations aviation safety inspectors. With the proliferation of the new technologically advanced aircraft (TAA) with their "flat-panel glass" cockpits, GA OPS inspectors with years of experience and thousands of hours in traditional aircraft, including those with flight management systems, needed to be trained in the new flat-panel cockpits. There were two primary reasons for this training requirement. The first reason is so the ASIs can learn how to fly the new equipment since most of the new GA aircraft delivered today are so equipped. The second, less obvious, reason for the GA OPS inspector, is safety. These inspectors may be test-

Embry-Riddle Flight Instructor Carlos Balderas works with FAA Inspectors Patrick O'Neill and Dan Malone as they plan their day's training flight.

ing a relatively low-time applicant in such aircraft. It is conceivable that the inspector might have to assume control of the aircraft to prevent an accident or incident and fly the aircraft back to the airport.

When he reviewed this article, one inspector commented that "from a human factors viewpoint, the interface between a pilot and the new flat-panel equipment is critical. One reason for the emphasis on TAA training today is to avoid situations where both an inspector and applicant find themselves asking each other while flying, 'What's it doing now?'" As he pointed out, the best place to find out how to operate the new equipment is on the ground, such as in an aircraft using ground power.

For those not familiar with the differences between the various FAA aviation safety inspectors, GA OPS inspectors are the inspectors who give most of the GA airmen practical tests or check rides that are not done by designated pilot examiners. These tests may include the initial flight instructor certificate or an airline transport pilot rating or flying with a GA company check pilot. When giving a practical test in one of the new flat-panel equipped aircraft, the inspector giving the test must not only know how to fly the aircraft, but the inspector must know the correct way to simulate various flight conditions required by the various FAA practical test standards (PTS). Failure to follow the aircraft manufacturer's procedures could possibly jeopardize the safety of the flight in marginal conditions. The aircraft manufacturer's operational restrictions may be more restrictive than the equipment manufacturer's procedures. This possible difference means it is critical for every pilot to know and understand the appropriate operating procedures and limitations for each particular aircraft and its installed equipment.

The challenge for FAA inspectors, designated pilot examiners, and flight instructors testing or training applicants in these aircraft is ensuring that the pilot in training not only knows how to fly the new glass-cockpit aircraft and use its installed equipment, but the applicant must also know its failure modes and how to fly using the aircraft's backup equipment. What makes this challenge even more interesting in this integrated digital age is how to test an applicant's knowledge because in some cases it may be impossible to totally fail one of the onboard flight systems without an actual failure. In the case of multiple display systems for example, some systems automatically transfer output to the remaining display screen or the pilot can select the display screen. In other cases, the recommended backup procedure is to continue to fly the aircraft using its autopilot with whatever sys-

tem capability remains. However, none of these options require the pilot in training to either practice or demonstrate the ability to hand fly the aircraft using its backup instruments. Because some failures may be impossible to duplicate in a training or testing environment, the best course of action is for the inspector, examiner, or instructor to question the applicant's knowledge through oral testing rather than having the applicant try to demonstrate the appropriate flight maneuver. Gone are the days when an instrument could be failed simply by covering it up and having the applicant fly the aircraft using "needle, ball, and airspeed."

Currently, there are three major manufacturers of popular GA flat-panel systems. The new systems are all different. In the past, if you knew how to operate one brand of the older analog avionics equipment, you could pretty much operate any other brand. Today, if you know how to operate one brand of a flat-panel glass cockpit system that does not necessarily mean you can operate a competing system. For example, what the equipment manufacturer (Garmin) recommends as a way of simulating equipment failure with the Garmin G1000™ system is not approved by one aircraft manufacturer (Cessna). In another case, simulating failure of one of the system components is not a problem in level flight as long as you remain within a 20-degree bank angle. Doing the same thing with another manufacturer's product may require straight and level flight for a specific amount of time so the system can realign itself. In the latter case, movement may extend the alignment time compared to the time required when the aircraft is stationary. Not understanding the difference between these two systems could result in the temporary loss of vital information while you wait for the system to reset itself, if you exceed the system's tolerances. If you were simulating this failure incorrectly in instrument metrological conditions (IMC) with an instrument rating applicant with limited actual experience, you just might have a potential problem. Then the issue may become one of how well you can fly the aircraft on its backup instruments.

As this magazine has tried to remind pilots over the years, it is one thing to understand how a system works. It is another thing to be proficient in operating the system. Add in an actual emergency or deteriorating weather, and the situation could get a little interesting. Compounding the problem is the fact that GA operations inspectors may see many types of GA aircraft in the course of a year. Because of their workload, GA inspectors may not have the time to become experts in every system and aircraft they fly in. But they do need to know and understand the general operating limitations of the new flat-panel aircraft they may have to give a check ride in.

This need for training is why the Flight Standards Service, this publication's parent organization, is sponsoring training for inspectors in the three major flat-panel systems in today's GA fleet. The systems are the Garmin G1000™, the Avidyne® Entrega, and the Chelton Flight Systems FlightLogic EFIS (Electronic Flight Instrument System) and its Highway-In-The-Sky (HITS)™. Each system approaches its goal of providing aircraft information differently. It is important to understand the uniqueness of each system and its design philosophy.

The Flight Standards Training Division (AFS-500) has contracted for this training through the following training facilities: Embry-Riddle Aeronautical University (ERAU) is providing Garmin G1000™ training at its Daytona Beach, Florida, campus; the University of North Dakota (UND) is providing the Avidyne training at its campus in Grand Forks, North Dakota; and Middle Tennessee State University in Murfreesboro, Tennessee, is providing Garmin G1000™ training in Diamond DA-40 aircraft. Each training site is providing classroom and flight training in the primary glass cockpit system listed for that site as well as providing classroom-only training in the other two systems. The critical differences between all three systems are pointed out to the FAA students during the training at each site.

I went through the ERAU training course at Daytona Beach, Florida. The 10-day course included both classroom training in all three systems as well as flight training in Cessna 172 and 182 Garmin G1000™ equipped aircraft. The course instructors were all ERAU flight instructors. In preparation for attending the course, each FAA student had to complete a graded pre-course training package on basic flat-panel technically advanced system concepts before departing for Florida. The pre-course package was to provide each FAA student a common background on the systems. The five students in my class included inspectors with air carrier, military, helicopter, and business jet backgrounds. Mike Cook was from the Richmond, Virginia, Flight Standards District Office (FSDO). Dan Malone was from the Baton Rouge, Louisiana, FSDO. Patrick O'Neill was from the Rochester, New York, FSDO, and Thomas Clifton was from the Des Moines, Iowa, FSDO. Each brought something different to the class. From military flight experience to civilian turbojet experience to air carrier operations, each inspector represented thousands of hours of flight experience in different types of aircraft. As FAA aviation safety inspectors, each was trained to evaluate applicant performance. The challenge each now faced was bringing that experience down into a Garmin G1000™ equipped Cessna cockpit. From being FAA inspectors, they were now "Garmin students." The only question was: Could the ERAU instructors, Amy Riehle, Scott LaVoy, and Carlos Balderas, turn this group of inspectors into GA glass-cockpit savvy evaluators in 10 days?

To facilitate the training at ERAU, each student was issued an FAA supplied lap-top computer with the Garmin G1000™ computer-based simulator program installed. Material discussed during the day could be reviewed and practiced that night on the computer. Planned flights could be reviewed the same way. Training manuals, CD's, system booklets, and

other training materials were provided each student. As one of the class's training slides noted when comparing the Garmin G1000™ Cessna 172 with the traditional Cessna 172, with TAA aircraft the "system manuals are often larger than the airplane flight manual."

Using a common university flight training technique, the instructors normally flew with two FAA "students" onboard. One student flew while the second one observed from the backseat. It is easier to comprehend what is being done when you are not the one having to do the activity, while being watched by the instructor and other student. The second student also provided an extra set of "eyes" watching for traffic. Although the Garmin G1000™ aircraft were equipped to provide traffic advisories, in the crowded skies of central Florida and especially in the Daytona Beach area, having another pilot watching for traffic was beneficial. With only five students in our class, one student was able to fly alone with the instructor which resulted in that student being able to fly both flight segments that day. The single student position was rotated throughout the class members so everyone was able receive the extra practice.

As one who had only a few hours in a G1000™ equipped aircraft before the class, I thought the training highlighted the need for anyone operating a new glass-cockpit system to be proficient in the system before venturing into conditions where you really need the system. Learning to program a new route in the GPS or making changes after selecting an initial approach reminded all of us of the need to become proficient with the new system before flying an approach to minimums. Even with an instructor onboard, I thought the workload initially was very high while learning to operate the system in flight to airports that I had never flown to before. Training with the computer-based operating system in the comfort of your hotel room was good. However, working with a mouse and having to "hit" the right spot on the computer screen to activate a desired change was not the same as operating the real equipment in flight with two people watching your every move. You are also flying and watching out for traffic and trying to remember how to load a new procedure into the GPS system, while trying to "hear" your aircraft's call sign as air traffic vectored you around central Florida.

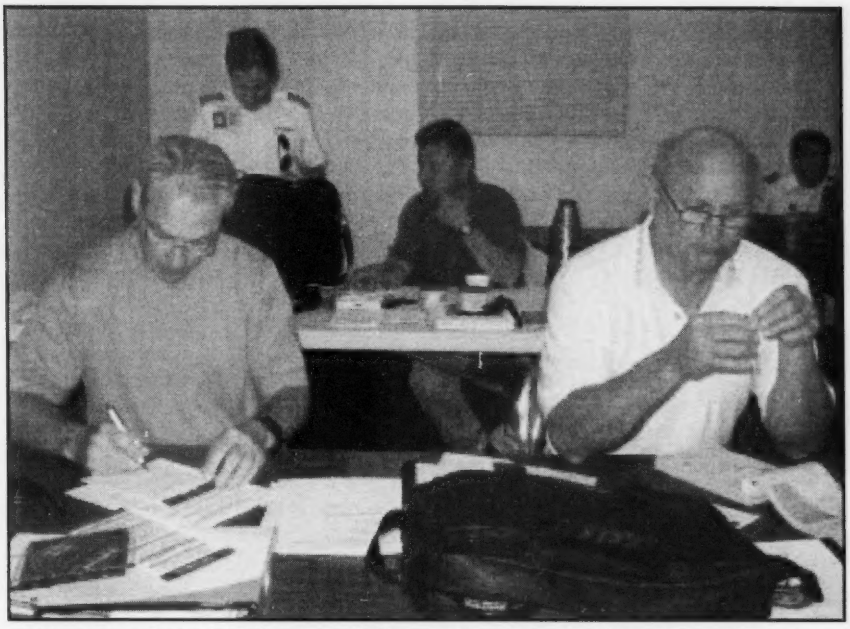
Looking back, I find it hard to image a new instrument pilot flying a single-pilot TAA glass-cockpit aircraft without hours of practice flying the TAA in Visual Flight Rules (VFR) conditions before doing it in instrument meteorological conditions (IMC). I think for anyone to be able to competently utilize all of the features found in the new TAA requires some very good training and practice in safe conditions. I think if you add in a busy terminal area, weather going down to minimums, a little turbulence, and some type of equipment failure, the situation could become critical for a pilot using a new system. I think even instrument pilots with thousands of hours flying in instrument conditions could be challenged using one of the new systems without adequate training and practical experience. It is not a question of knowing how to operate in the National Air Space. It is a matter of knowing how to operate the particular system in your aircraft. For example, Chelton's training manual's introduction states, "We recommend flying the system for 10 hours and completing at least five full instrument approach procedures (including the missed approach) in VFR conditions before use in actual instrument conditions. Professional instruction and recurrent training are highly recommended."

If you think of the new glass-cockpit systems as very specialized computers that have to be programmed a specific way, then it becomes critical that you learn the exact method to enter the data, or you won't be able to operate the system. The good news is that in many cases there is more than one way to enter the data. Once you learn the "long" school solution way, there may be "short cut" ways to enter the required information.

To ensure safety, FAA inspectors have to learn both the basic operation of the new systems, as well as the unique operating limitations of each of the major brands. They may have to operate the system from the right seat with a relatively low-time pilot applicant in the left seat. As one inspector said during the training course, "I would not want to conduct an initial instrument practical test in a glass cockpit in IMC. I want good visual conditions to conduct the test in case I have to take control of the airplane."

To provide that training for the Garmin G1000™ system, the ERAU course used scenario-based training from both the left and right seats. The FAA "students" practiced the basic operation of the system from the left seat. This included using and becoming proficient in operating the Primary Flight Display (PFD) as well as the Multi-Functional Display (MFD) while on actual flights within the central Florida area. Being able to properly program the navigation system enabled the students to work around the many special use airspace restrictions in the area. Being able to practice navigation, non-precision and precision approaches, holding, and system failures in flight to different airports added to the realism.

Learning how to use and operate the PFD and MFD meant not only learning how to preflight, use, interpret, and change the displays, but also the emergency use of both displays. In the case of a total display failure, the system is designed to automatically transfer critical data from one display to the other. For example, if the pilot's PFD fails, the critical flight data is automatically transferred to the MFD. The capability also exists for the pilot to manually transfer or flip-flop the displays. Since these displays are all electronic, there is a backup battery system in case of a total aircraft electrical failure. The independent battery system is designed to give the pilot enough time to get the aircraft on the ground. Knowing how to use these systems and the emergency procedures provides FAA inspectors the knowledge to safely test applicants in



FAA Inspectors Patrick O'Neill (left). Dan Malone (right) and Thomas Clifton (right rear) complete their flight planning as Embry-Riddle Flight Instructor Amy Riehle prepares for the flight.

the systems without compromising the safety of the flight or inadvertently violating an aircraft's operating limitations.

To test that knowledge, the FAA students then had to learn and practice operating the system from the right seat while the ERAU instructors played the role of applicants in the left seat. The FAA students learned how to safely simulate aircraft system failures from the right seat while evaluating the ERAU instructors to the FAA practical test standards. These were the same procedures the inspectors would use while evaluating a real applicant during a practical test. The final flight test for the FAA students was a simulated practical flight test with the ERAU instructors acting as applicants. The tests varied in format. From simulating poor airmanship which exceeded the practical test standards resulting in a failed practical test to an applicant becoming ill necessitating a discontinued test and the FAA student assuming control of the aircraft, the ERAU instructors tested the FAA students understanding and use of the G1000™ equipped airplanes.

In the past, an inspector would fail an instrument by covering it up the traditional round "steam gauge." In today's glass cockpits, you just can't find a "yellow sticky" large enough to cover a flat-panel display. Nor, if you are the aircraft owner, do you want someone putting anything sticky on your mega-dollar flat-panel display. Today, failures are simulated as per the aircraft manufacturer's recommendations. For example, Garmin says you can fail its equipment by pulling circuit breakers. However, Cessna and Diamond say you can't pull its circuit breakers to simulate a flat-panel equipment failure. This is why it is important that each inspector and designated pilot examiner know the operating limitations for each type of glass-cockpit system being used for a flight test. The same is true of pilots who may fly more than one type of system. As other articles published in this magazine have said, it is critical for pilots to receive proper training and be able to competently operate the new systems. For those providing training or testing in the new aircraft, it is equally important that they know the operating limitations and any special operating procedures needed to safely perform that training or testing.

As everyone gains more experience in flying the new GA flat-panel aircraft, new ideas are developed. For example, the FAA's Course Manager for the TAA Program, Brian Dunlop, when reviewing this article, reported he has a copy of a cut-out from a Cessna glass-cockpit course that can be suspended from the top two knobs on the flat-panel display that masks parts of the display based upon the failure being presented. The cut-out makes it easy to simulate a particular failure in flight without creating a possible system failure or harming the panel's screen. As he stated, "This gives a better failure representation than just dimming the screen."

These systems are new. The potential risks are there for those who fail to follow the special training or testing requirements for each type of flat-panel system. And as Dunlop noted above, new ideas are being developed to make testing easier and safer. The challenge for everyone is knowing how to properly operate the various systems. Inspectors testing or checking pilots in the operation of these new glass-cockpit equipped aircraft must know and follow the proper operating limitations for the type of equipment being used. That is why the FAA is providing this specialized training for its general aviation inspector workforce. These glass-cockpit training courses are just one way the FAA works hard to keep its inspector workforce knowledgeable about today's aircraft. Now, inspectors must add these new flat-panel equipped aircraft to their mix of traditional round-dial aircraft they fly so that they are current and proficient in both types.

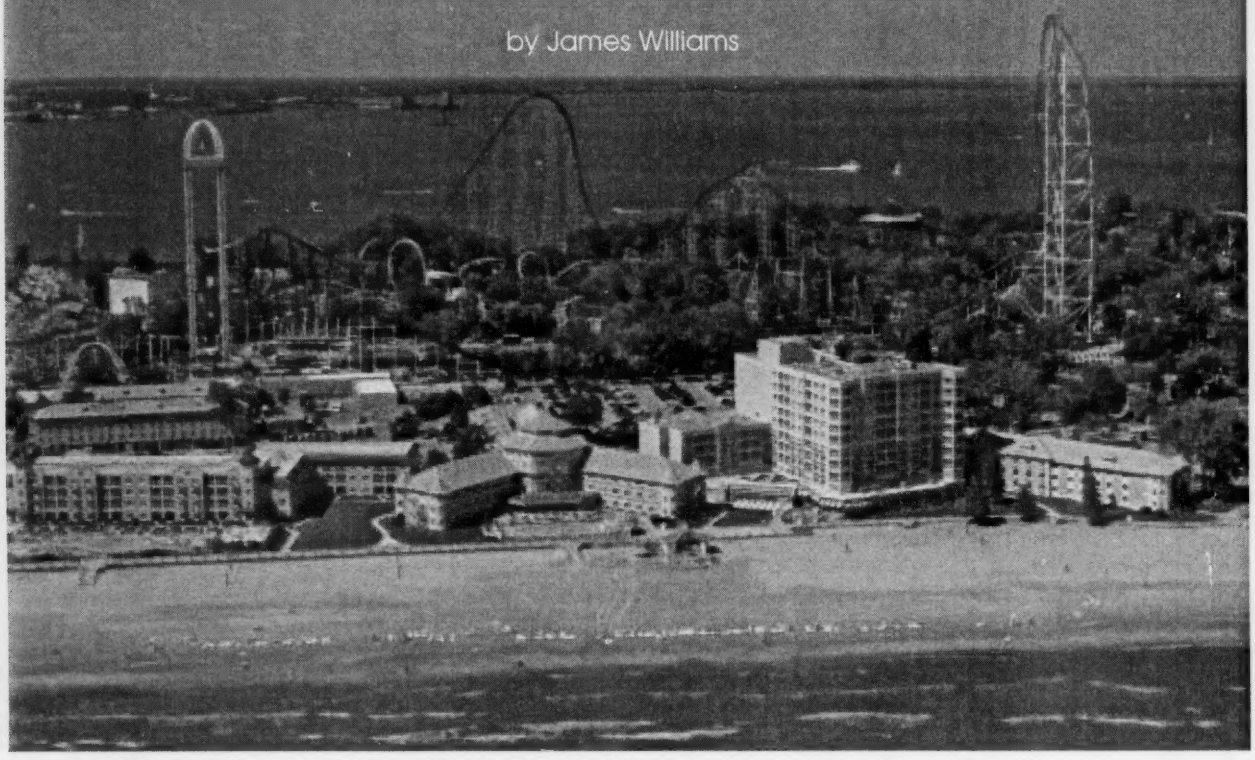
+

Answers to quiz: 1—(d.) All of the above; 2—(b.) No, not recommended by Cessna; 3—(c.) The GPS is the active navigation source

Beyond the $100 Hamburger

Flying Vacation Preparedness

by James Williams



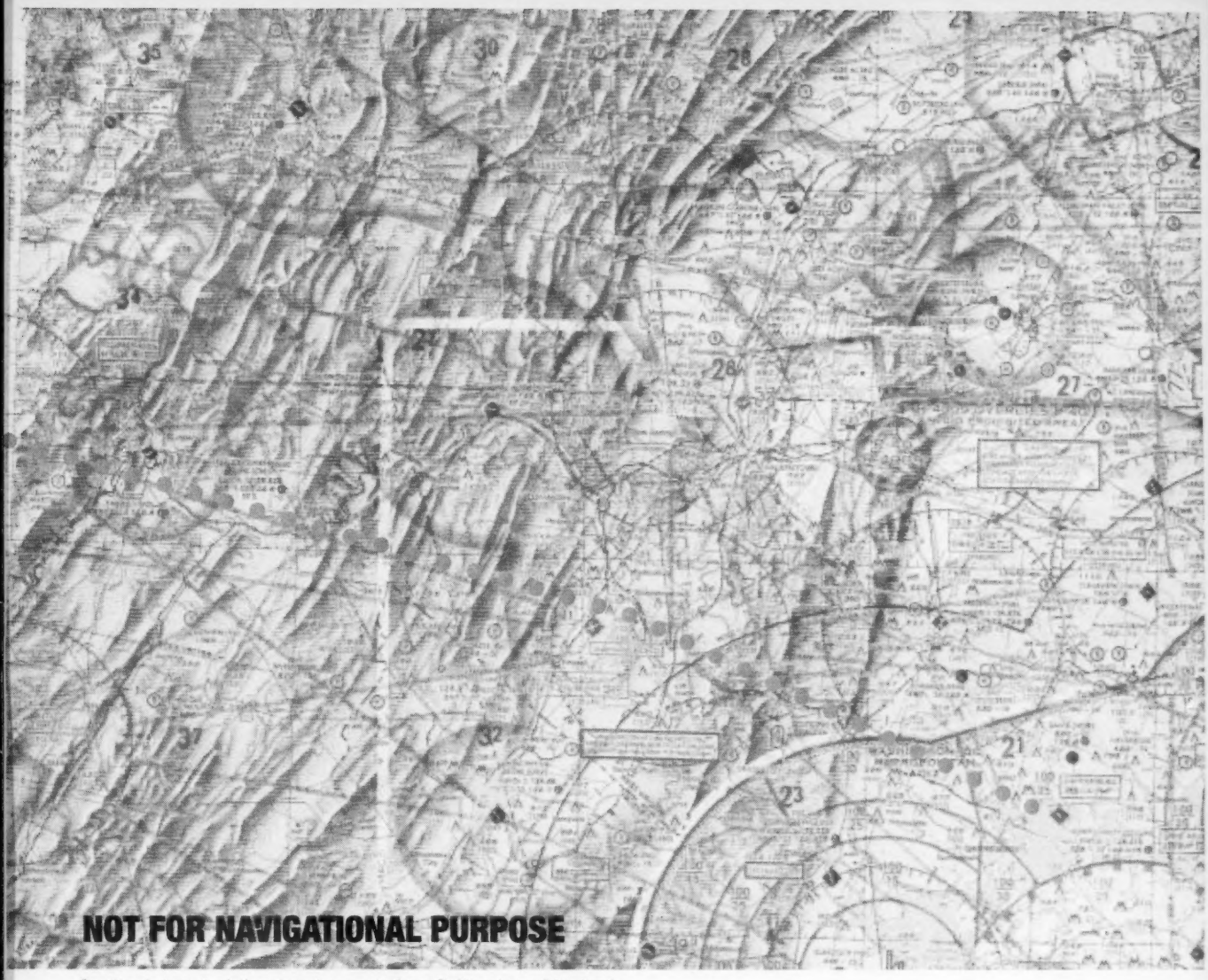
Cedar Point Amusement Park and Resort, Sandusky, Ohio, Photo courtesy of Cedar Point.

The snow has long since melted. You've done a flight review, and, if you're instrument-rated, you've done your Instrument Proficiency Check (IPC). Your airplane is up-to-date and all those nagging maintenance issues are solved. So what now?

Well, you could fly two towns over and stop at your favorite shake shop for that $100 hamburger, or maybe you're feeling a bit more ambitious. Perhaps you've scheduled a long weekend or a few days off work or even a family vacation. One of the great things about being a pilot is that, when things work out, you can grab your flight bag, head out to the airport, and a few hours later be several states away. When you have a few days, the list of possible destinations expands tremendously. And there are always those places you've been meaning to visit that are only a few hours away by air. Even for those aircraft with a more relaxed pace, a day's worth of flying can take you quite a distance. However, whatever the length of your trip, it is in your best interest to become familiar with your proposed flight path, so you can make some simple decisions before starting out. In this way you simplify your choices and allow yourself to make intelligent decisions, if the need arises.

When you consider these trips, you also must consider more complex issues than when you head out to the airport for your $100 hamburger. Now you're looking at a trip involving fuel stops; a flight plan (IFR or VFR); alternate, unfamiliar areas; a possible change of climate or terrain; unfamiliar airspace; and possibly even more factors. So clearly this is no longer a "check the ATIS (Automatic Terminal Information System) and go" affair. There are many decisions to make.

Let's consider two different types of trips. The first is a short trip with less rigorous requirements. The second is a longer, more intricate, trip that will require more attention to detail. The first flight is from Montgomery County Airpark (GAI) in Gaithersburg, Maryland, to Sandusky, Ohio, (SKY). The second flight is from Tucson, Arizona, (TUS) to Jackson Hole, Wyoming (JAC). Each of these flights has different challenges and different potential passengers. Just one quick comment: As it says on those old demonstration charts you used in



Sectional chart depicting departure route from Gaithersburg, Maryland.

ground school, this article is NOT FOR NAVIGATIONAL PURPOSES. Even if you are planning to fly exactly these routes, you need to do your own planning and make decisions that suit your own flying style, comfort level, and aircraft capability.

Scale of Planning

The first choice we have to make is the length of our trip. This will determine our scale of planning. A hop to the next state requires less planning than a true cross country excursion. My personal preference on long trips to completely unfamiliar airports, or ones I rarely visit, is to use Instrument Flight Rules (IFR). This is especially important in the Washington, DC, area to avoid any issues with the Air Defense Identification Zone (ADIZ), but more on that later. In any case going IFR allows me to not worry about airspace clearances and restricted areas along the way. Although you should make an effort to be familiar with the areas you are traveling through, going IFR ensures you won't be denied entry into any Class B airspace along the way.

In deciding to go beyond the $100 hamburger flight, we have to plan for fuel stops and possibly overnight stops. In running longer flights you have to deal with operating the aircraft near its range limits and setting realistic reserves. This is where research and planning is important because knowing your route of flight will dictate how much reserve you need to carry. For example, doing most of my training in Florida, the need to carry a large reserve was pretty minimal for most flights. Along the east and west coasts of Florida there seem to be airports everywhere. The corridor between Tampa and Orlando also has no shortage of available stopping points. But traveling directly from the Fort Myers/Naples region to the Fort Lauderdale/Miami region could be daunting for pilots unaccustomed to being out of sight of hospitable landing sites.

By deciding the scale of the trip we want to undertake, we can start to consider what destinations lie within

Sectional chart depicting P-40 prohibited area.

our range. The kind of passengers we plan to have aboard will also affect the scale of the trip. A trip of about three or four hours with a stop in the middle for a family vacation would allow for manageable legs for small children and would not stretch the range of the aircraft. If we are carrying young children or people less comfortable with flying, we may want to plan a shorter trip with more stops. If our intended passengers are adults with no qualms about flight in general aviation (GA) aircraft then we don't have to be as concerned. We could select a two day trip which would require a closer to maximum range approach, and fuel management and planning become more important.

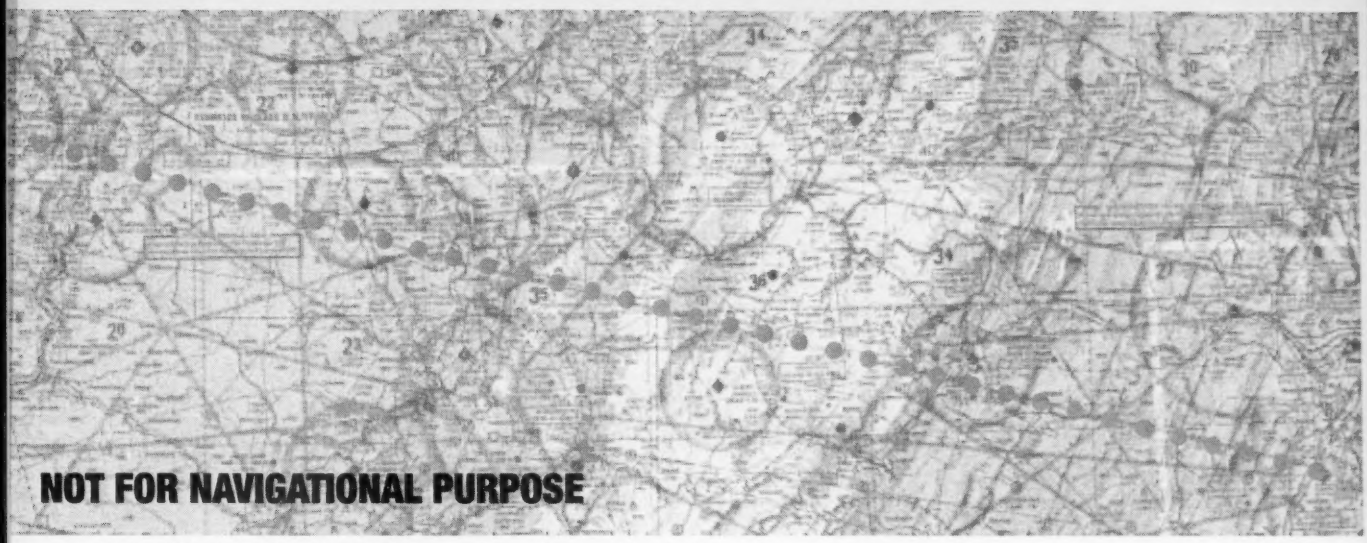
Research

Now that we have an approximate range and a stop strategy in mind we can start to look for possible destinations. Usually I have a destination in mind before I start planning, but some of the best trips can be ones where you don't have a preconceived destination in mind. Take a map and measure out a piece of string, stick, or something to the mileage scale, and place one end at your departure airport. This will allow you to quickly figure out what destinations lay within the reach for your adventure. A personal favorite of mine is Sandusky, Ohio. Living in the Washington, DC, area, Sandusky is well within reach at less than three hours flying time for most aircraft in most conditions. Sandusky is home to Cedar Point, in my opinion one of the best amusement parks in the world. The park is geared toward roller coaster enthusiasts, so if that is your kind of park, you will not be disappointed. This makes it a good weekend vacation spot for many people.

Now that we have a destination, the hard work starts. We are departing from Montgomery County Airpark (GAI) just northwest of Washington, DC, in Maryland. For the most part, this is a pretty simple flight. There are mountains that need to be crossed, but they are relatively small. Our biggest challenge will be airspace. Our path of travel will take us from the Washington, DC, ADIZ through the Pittsburgh and Cleveland Class B areas. Also along our way is the Prohibited Area known as P-40, which expands from a 5 to 10 mile radius when the president is there. Keeping informed and giving it a wide berth is advised. There is also a restricted area that sits on top of P-40, so attempting to over fly P-40 to avoid it is ill-advised. Checking *Notices To Airmen* (NOTAMs) for this area is critical, so make sure you get your money's worth out of your briefing. This is definitely a briefing I would want to do by phone, not computer, and if you are unsure about anything ask the briefer.

The other major airspace restrictions are Temporary Flight Restrictions (TFR). TFRs restrict the airspace around and over events, VIP movements, and other sensitive things. Two examples include the TFR around Kennedy Space Center during space shuttle launches and the TFRs over major events like the Super Bowl. These TFRs are usually announced ahead of time and Flight Service should be able to let you know. In the case of VIP movements, these TFRs can be moving restrictions which is a good reason to be in touch with air traffic control (ATC).

If you are flying in the DC area, become very familiar with all the security procedures involved while doing your preflight planning. This will lessen potential problems once you are in the air. You will need to be in contact with ATC, have an assigned transponder code, and file a flight plan (at least a DC ADIZ flight plan) to depart the ADIZ, so you might as well use the rest of the benefit of IFR handling and go IFR. If IFR isn't an option, you must at least file a flight plan and request flight following. This will improve your chances of not having your day ruined by a Class B airspace violation or worse by a U.S. Air Force fighter pilot politely, but firmly, recommending you land immediately so you can have a long discussion with nice



Sectional chart depicting the route between Gaithersburg and Sandusky.

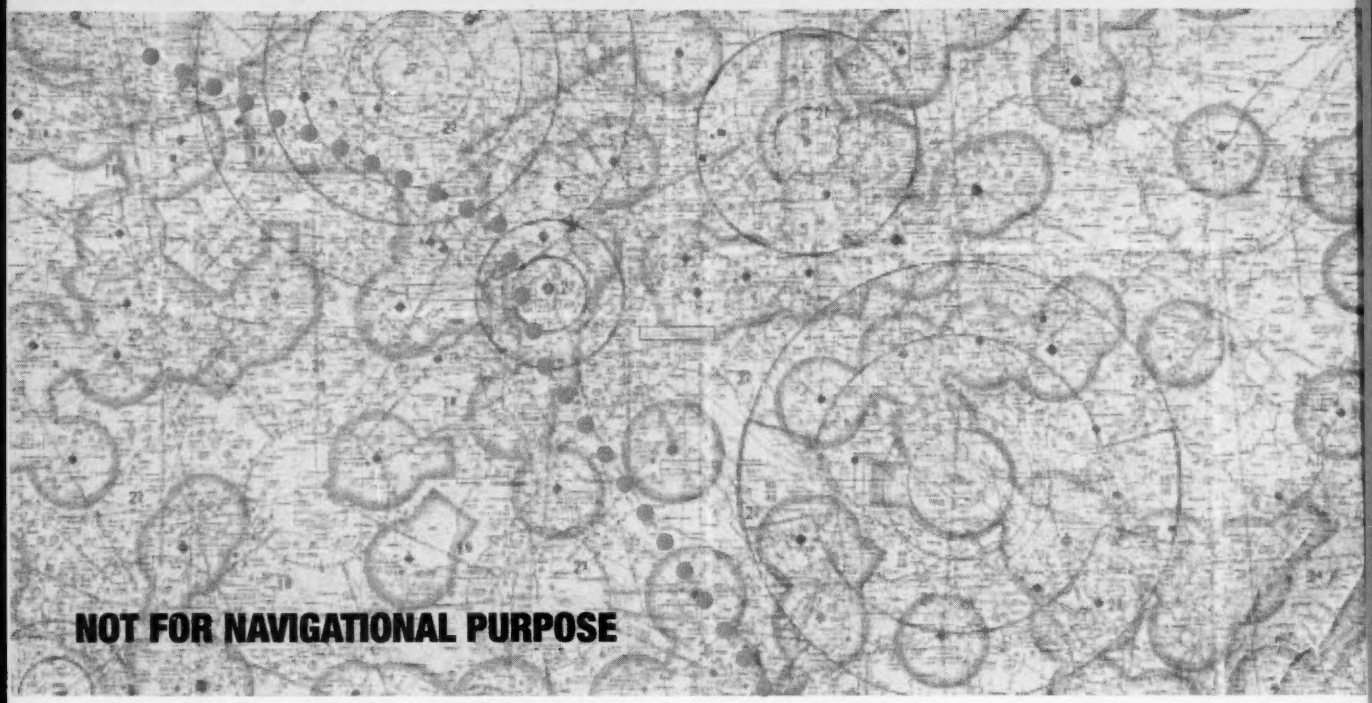
people from various local and Federal law enforcement agencies. Also be very aware of your location within the ADIZ. Another way to ruin your day is to change your transponder code while still within the ADIZ's boundaries. These kinds of incidents almost always end up in enforcement actions and no one wants that. The best solution is to stay informed and in touch with ATC. It might not solve all possible problems, but it will help a lot.

Now that we have a quick overview of what lies between us and our destination, it's time to figure out precisely where our flight path is. One of the quickest ways to do this is to go to the Direct User Access Terminal System (DUATS). This is an FAA funded program which allows pilots to get weather briefings and other information online. It also allows flight planning and filing of flight plans over the Internet. There are two DUATS providers. The first is <www.duat.com>, the second is <www.duats.com>. These sites sound similar, but are run by two different companies. Duat.com offers a more graphical interface with greater complexity. Duats.com offers a simpler more text-based system. Both have their advantages and it's really a matter of personal preference which one you use. For this article I used duat.com. DUATS can generate a flight planner based on a number of different methods of navigation (VOR to VOR, Airways, RNAV Direct). As a pilot who learned how to fly instruments using VORs (Very high frequency Omni-directional Ranges) and NDBs (Non-Directional Beacons), I usually prefer to follow the airways. This gives you protected airspace and guarantees you obstacle clearance as long as you comply with the relevant altitude restrictions. So after punching in a few details about the aircraft and selecting the type of route, DUATS generates a flight planner for our flight. This is what the flight route will look like: GAI LUCKE V8 BSV V40 DJB V6 SKY. DUATS calculates 301 nautical miles, two hours 33 minutes enroute, and 25.8 gallons of fuel burned. Of course, these numbers are based on many assumptions about aircraft performance and current weather (most notably no wind for this particular time and fuel burn). But this gives us a starting point. In light or even moderate head winds this is probably a one leg trip, unless other factors dictate a stop. So now that we have a basic plan and fuel strategy, let's get down to the planning.

Planning

We need to look a little closer at those charts we scanned earlier. I would recommend using both VFR and IFR charts, since both are needed to get the full picture. First, let's look at our route. GAI LUCKE V8 BSV V40 DJB V6 SKY. That's the short version. In reality we're going to go direct to Westminster VOR (EMI) for radar identification. From there it's still possible to proceed to LUCKE, but it's likely we'll get vectors on course. Our IFR flight plan is composed of checkpoints at Navaids or airports (three letter identifiers, e.g., MRB, although anyone using GPS will precede U.S. airports with a K, e.g., KGAI), intersections (five letter identifiers, e.g., LUCKE), and airways (identified by a letter and number, e.g., V103, in this case they are V or Victor Airways since they are below 18,000 feet; above 18,000 feet they are call Jet routes and J's are used instead of V's). Our expanded plan would be GAI EMI LUCKE V8 MRB V8/V213 ELGEE GRV V8/V92/V214 CHOKE GALLS OBEID AHTIY AIR V8/V75/V103 ATWOO V8/V75 BSV V40/V75 JOSEF KEATN RITZS SAROW DJB V6/V30/V126 SKY.

With our route selected, we can start looking for alternate and emergency landing sites. Obviously, in the case of something like a fire or engine failure, we might not have much choice where to land, but in the majority of emergencies we have some time and latitude to decide where to stop. So having some familiarity with what is along the route of travel is a good thing. You really don't want to be rapidly scanning the *Airport/Facility Directory* (AFD) or, worse yet, blindly diving toward a random airport. So it's best to take a few minutes in advance to look into what airports and what services are available at those airports in terms of approaches, maintenance, fuel, lodging, rental cars, etc. Although *FAA Aviation News* does not



Sectional chart depicting the arrival route to Sandusky, Ohio.

endorse any company or product, another good source is the Web site <www.airnav.com>. Air Nav lets you see what services are available and shows reviews of fixed base operators (FBO) and other services on the airport. Taking 30 minutes or so to look into alternatives and some airports along the way could make the difference between a pleasant diversion and a nightmare stopover. It is also a good idea to call ahead to destination and alternate airports to insure that services are available. Some FBOs operate seasonally or change hours during low seasons, so it's wise to call and be sure at least minimal services are available. In the case of our example I would nominate: Greater Cumberland Regional (CBE), Morgantown (MGW), and Akron Canton Regional (CAK) airports as potential stopping points. Burke Lakefront (BKL) and Mansfield Lahm Regional (MFD) would make good alternate choices. Why did I choose these as stopping points and alternates? All have Instrument Landing Systems (ILS) and four of the five are towered. I have always preferred towered airports. If you don't, just pick another one, there are a host of options. As was discussed in a previous *FAA Aviation News* issue, there are good reasons for picking larger airports. (See "A Tale of Two Diverts" by Michael Lenz, in the January/February 2007 issue on the Internet at <http://www.faa.gov/news/aviation_news/2007/media/JanFeb2007Issue.pdf, page 11>.) The point is to look around and pick airports that suit your needs and preferences, and familiarize yourself with some of the things you're planning to fly over.

So far we've only discussed IFR planning, let's take a minute to look at Visual Flight Rules (VFR) considerations. My major concern would be airspace, airspace, airspace. There so many things to trip over along this route that you really should be on your toes. As mentioned earlier, you must receive a transponder code and be in communication with ATC within the ADIZ. This means contacting ATC before takeoff. If you need a refresher on this airspace, you can take a short online course from the FAA Safety Team (FAASTeam) about Navigating the DC ADIZ, TFRs, and Special Use Airspace at <http://faasafety.gov/gslac/ALC/course_catalog.aspx?categoryId=11>. As part of your preflight planning, you should ask about departure procedures at your FBO to make sure to give yourself every possible advantage. You may also contact the National Capital Regional Coordination Center (NCRCC) at (703) 563-3221 with questions about the DC ADIZ. Again, preparation is key here. Make sure you have a good idea what you're doing before takeoff and, when in doubt, ask. Ask before you take off and put your certificates in jeopardy. The current NOTAMs outline the procedures for operating in the ADIZ.

Assuming you've done what you need to do get out of the ADIZ, let's look at some basic checkpoints. With the airspace restrictions around Washington, DC, VORs would make good initial checkpoints. VORs allow you to minimize navigation errors in this critical area. The path from the Fredrick (FDK) VOR to the Martinsburg (MRB) VOR would allow you to cleanly exit DC and then resume your own navigation knowing you were well clear. After MRB you could follow the same route as the IFR flight planner. In reviewing the VFR charts, there doesn't seem to be a compelling reason to deviate too far. This path allows you to avoid Pittsburgh's Class B airspace to the north. Further along you may chose a more southerly course to avoid Cleveland's Class B, although the more northerly route does provide a higher airport concentration along the route. Either route would allow for VOR navigation.

Sectional chart depicting the area around Tucson, Arizona.

Weight and Balance

A quick word on weight and balance might be warranted here. Not about how to calculate it, since any private pilot or beyond will be able to tell you, but about why we need to consider it. For many pilots the long trip with bags and passengers is something out of the ordinary. Many pilots spend time doing training, or going on short jaunts, or just simple pleasure flights. In training we tend to have very similar weight and balance every flight, and every flight we take off with no problem with plenty of runway to spare, and no control problems to deal with. We get used to maybe 10 pounds of flight bag in the back seat and nothing in the baggage compartment.

Now we have an entirely different situation. You probably have maybe two or three passengers, baggage, and whatever else is needed (perhaps some spare oil). So now we've got to be concerned about gross weight and center of gravity (CG) issues. That's before we start thinking about fuel loads. For longer trips we want to carry as much fuel as possible, but now we have to sit down and calculate how much we can take. We also need to consider our carrying needs. Four people and bags might not be possible in some GA aircraft, no matter what fuel load. So you need to know what you can take with you and what kind of fuel adjustments can be made without compromising safety. These factors will be especially important in our second example where density altitude becomes an even bigger factor and there is less performance to be had. Remember just because you can get it off the ground and maybe, just maybe, get it up to altitude outside of either CG or beyond max gross weight, it doesn't mean you're home free. It's usually when you least expect it and are least prepared that bad things happen. Knowingly exceeding the aircraft's capabilities is just asking for trouble.

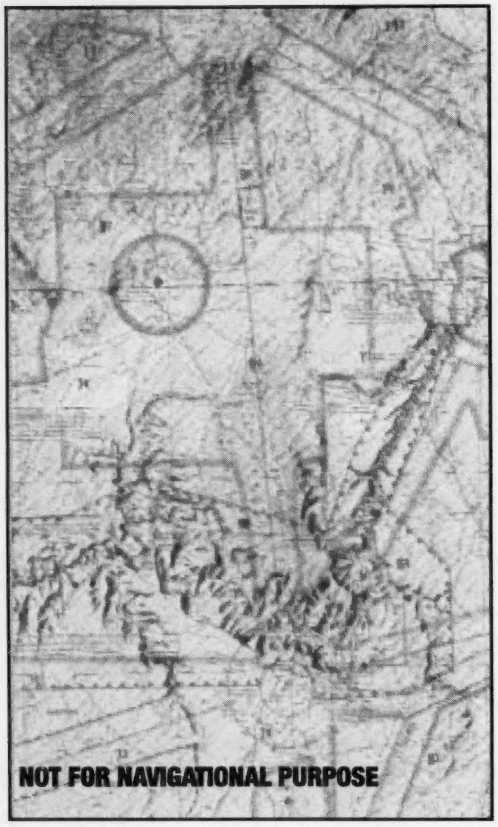
I won't discuss detailed flight and fuel planning more than I already have, but a word on fuel reserves is warranted. In most cases the flight of 300 or so miles should be easily made with plenty of reserve. But remember, the more fuel you have means more options in case you need to deviate. Keep in mind that if you feel like the winds are stronger than predicted or you get delayed, you can always stop to refuel. Better be an hour late with lots of gas, than not make it at all. One trick is to figure out a ground speed at which you will start to cut into your reserve. This "Do Not Accept Speed" will give you a predetermined metric for making a decision. While this is not a hard and fast process, it gives you a clear decision point that says if my groundspeed falls below this point for more than a few minutes I need to start thinking about stopping for fuel. This concept is used in long range flights where options are limited and fuel margins are tight, which brings us to the next proposed trip.

Planning Trip Two

For a different perspective, let's consider a flight from Tucson International in Tucson, Arizona, (TUS) to Jackson Hole in Jackson, Wyoming (JAC). The Tucson to Jackson Hole flight poses an entirely different set of challenges. The theme of this flight could be called the National Park survey. The course of this trip passes over or near Grand Canyon National Park, Bryce Canyon National Park, Tetons National Park, and, of course, Yellowstone National Park. These are some of the most scenic and rugged areas in the country. The 755 mile flight demands at least one stop for most GA aircraft. In light of the difficult terrain and lower availability of bail out airports, two stops might be a wiser strategy. While airspace is a consideration as always, one of your biggest challenges will be mountainous terrain. With that challenge comes high field elevations and density altitudes. This may also play a significant part in your fuel and load planning as it could place serious restrictions on where or when you could land. It would also restrict how much you can carry in terms of people, baggage, and fuel.

Supplemental Oxygen

Another issue we face on this trip is for supplemental oxygen. Much of



Sectional chart depicting the area around Grand Canyon National Park.

the Victor Airway route to Jackson Hole has Minimum Enroute Altitudes (MEAs) of more than 12,500 feet above mean sea level (MSL). Title 14 Code of Federal Regulations (14 CFR) section 91.211 states: (a) "General. No person may operate a civil aircraft of U.S. registry-

(1) At cabin pressure altitudes above 12,500 feet (MSL) up to and including 14,000 feet (MSL) unless the required minimum flight crew is provided with and uses supplemental oxygen for that part of the flight at those altitudes that is of more than 30 minutes duration;"

With even the lowest available IFR altitudes at 14,000 feet MSL, we know that supplemental oxygen is going to be a factor if we want to fly IFR. This also means we need to think about performance. These altitudes may exceed your aircraft's service ceiling. In fact they probably do. According to Cessna, the service ceiling of a brand new 172 is 13,500 feet MSL. While you might be able to get the aircraft up there, it might not be able to perform properly in the event that emergency maneuvers are required. One of the other major players in the rental/single owner market, the Piper *Cherokee/Warrior/Cadet*, has a ceiling of 11,000 feet MSL in its newest model the *Warrior III*. I have heard reports from some other pilots of climbing *Warriors* to 14,000 feet, but personally I've found the *Warrior* struggles beyond 10,000 feet. My point is that, while you might be able to get the aircraft up to these altitudes, you would find yourself very performance limited and possibly unable to hold altitude.

Considering these factors, a VFR flight seems to be the best option. Although this places weather restrictions on the flight, it is probably the only way to get the flight done under the service ceiling of small GA aircraft. This is not to say that the flight can't be done IFR by a number of different aircraft, but in our mainstay *Skyhawk/Warrior* it would be difficult. This means you need to very carefully calculate the kind of aircraft performance the manufacturer says you can expect. I would round down from there to give yourself an extra safety margin. It's always better to have a little more performance than you need as opposed to a little less (as in just clearing the top of a mountain versus just failing to do so).

Density Altitude

As mentioned previously, density altitude is going to be a big consideration on this trip. A brief scan of the sectionals for the general route show that north of Phoenix, Arizona, the ground rapidly becomes a series of tan and brown patches proceeding to dark brown and more reddish hues. This is a nice way of saying on a trip like this you are probably going to have to be very careful in calculating your density altitude, because its effects could put you in a situation where you may have to delay or even reschedule your trip. With landing fields at 4,000, 5,000, or 6,000 plus feet above sea level a reasonably warm day, much less a hot one, could make it impossible to take off safely. You might be able to get in, but you won't be able to get out until things cool off, so keep that in mind. For a

Sectional chart depicting the area around Salt Lake City.

Sectional chart depicting the area around Jackson, Wyoming.

more complete discussion on density altitude and its effects, see Doug Gilliss' article, "Into Thin Air" in our March/April 2007 issue at <http://www.faa.gov/news/aviation_news/2007/media/MarchApril2007.pdf>.

Survival Gear

Another thing to consider is survival gear. In looking at the general path of travel, you'll probably realize there are long stretches where there just isn't much around. This makes carrying survival gear a really good idea. If an emergency occurs and you're forced to put the aircraft down off the airport, that's just the start of your problems. Even if you ace that landing you could be miles away from the nearest help. This means you need to be prepared to spend some time on your own. There are places where even if rescuers know exactly where you land, it might take a while for help to reach you. You need to consider bringing along supplies for all occupants.

With sections of the route covering both high and low deserts, in addition to some of the most rugged terrain in the country, there are many differing survival concerns. The low desert is characterized by extreme heat and lack of shade or any resources. The high desert is a dangerous place also. The days are hot, but in many cases don't seem nearly as hot due to lower humidity and the fact that your sweat is evaporating before you know it's there. This leads to dehydration so water is critical. Nights can be cold. This temperature swing can be a problem if you are not prepared. More recommendations and information about survival planning can be found in our January/February 2007 issue (available at <http://www.faa.gov/news/aviation_news/2007/media/JanFeb2007Issue.pdf>), the article deals mainly with winter flying, but many of the points apply and resources highlighted in the article could prove valuable in many circumstances.

Route Overview

Now let's look at our route a little more closely. I'm proposing two stops. The first is at Grand Canyon National Park (GCN). I'm sure the fuel might be more expensive—but it's the Grand Canyon, how could you not stop there? For our second stop I selected Utah's Ogden Hinckley (OGD) Airport just north of Salt Lake City. My reasoning is the same as before, both airports are towered, both have ILSs. Even if we are going VFR, we want to give ourselves options. The

first leg between Tucson and Grand Canyon is about 260 miles. This is well within the range of our aircraft and leaves us a large reserve in most cases. Although atmospheric conditions or carrying needs could dictate a reduced fuel load, leaving a margin would be wise. Grand Canyon to Ogden is about 330 miles; the flight distance might be a little more depending on how much deviation is necessary. The amount of deviation will depend on current conditions though, so it's hard to say ahead of time. The final leg from Ogden to Jackson Hole is about 220 miles, which leaves you plenty of fuel for a possible diversion. These shorter legs give us maximum flexibility in case of weather or other factors.

On this route there are very few choices for alternate or emergency airports. This is the nature of the area and something those of us from other regions aren't used to. I would recommend looking up the information for some of the airports that are situated anywhere near your flight path. This leads me to a bigger issue, route planning. This may mean selecting the route with the most advantages, not necessarily the shortest route. It could be that route A is over flat ground and route B is over the mountain. Maybe route A has more airports along the way. But maybe route A takes you closer to the city and you don't want to deal with the airspace at the local airline hub. So it's about picking the route that makes the most sense.

In this flight we have a perfect example. The shortest route for the final segment of the flight proceeds directly from the Malad City, Idaho, area to Jackson Hole, roughly along the path of Victor 465. While this is a perfectly fine route, there are some disadvantages. The terrain is rough and high. While the high part is generally unavoidable, the rough part should be noted. Also you see there is not a lot of anything out there. As I mentioned earlier, this could lead to a more difficult survival situation. An alternative might be to head north out of Malad City and follow the roads toward Arimo, Inkom, and Pocatello, Idaho. From there you could turn northeast and fly over Idaho Falls, Rigby, and Parker before turning southeast toward Driggs. From Driggs you could fly on to the Teton Pass and over to Jackson Hole. This route, although longer, provides you with airports and cities along the way. Think of it as an insurance policy against changing conditions.

Mountain Flying

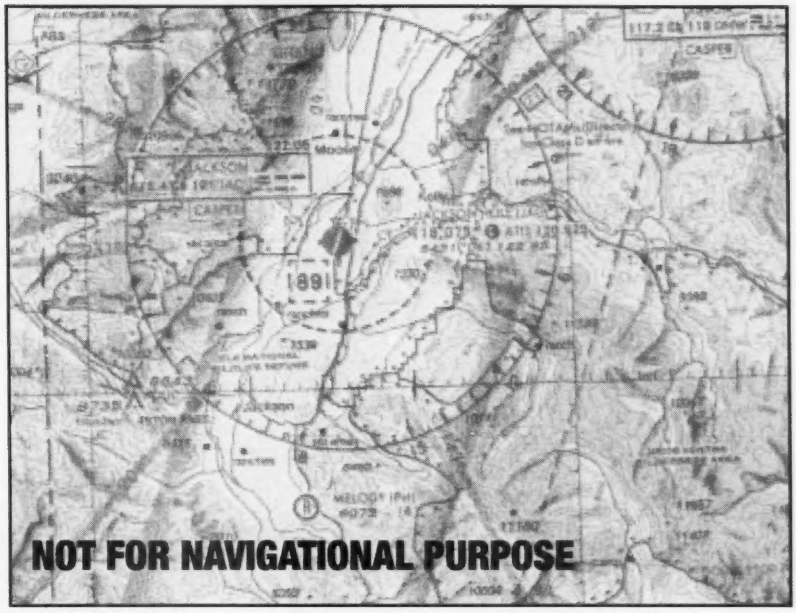
Flying in the mountains is a significant change for us flatlanders. For us, 8,000 feet is a high cruising altitude. In these Western mountains that could be several thousand feet underground. It's a shift in thinking, to say the least. Mountain flying is a skill of its own requiring excellent pilotage and dead reckoning. In preparing this article, I contacted Bryan Neville and Rick Stednitz of the FAA Aviation Safety Team (FAASTeam) out of Salt Lake City who were able to provide me with some excellent insights into mountain flying and flying in the Salt Lake City area. This leads me to another point. The FAASTeam is there to help pilots. So before a trip into unknown areas, log on to <http://www.faasafety.gov/>. There are many FAASTeam representatives and managers who would be happy to give you some advice or words of caution to help you complete your trip safely.

In many cases electronic navigation aids (Navaids) like VOR or NDB are useless because of blocked signals. Conversely, because you are flying high, it is also possible to pick up multiple VORs on the same frequency, so it's very important to carefully identify the VOR signal you have. Having a current sectional is imperative. Blindly following a direct to course from a GPS could likely put you in a canyon, mountain, or cliff face your aircraft can't climb out of, over, or around. This is why inexperienced mountain pilots would want to fly routes with the least possible chances for problems. Again planning ahead would provide you with assistance that could be key. There are a few books dedicated to the topic of mountain flying. One such book is *The Mountain Flying Bible*, by Sparky Imeson. Reading a good book on the subject is a start, but you might also consider calling ahead to one of your fuel stop airports and arranging to talk to a local flight instructor or FAASTeam member with knowledge on the subject. For the price of an hour or so of ground time, or perhaps just a lunch, you could get some insights into the local area and mountain flying in general. But remember, you need to have some knowledge and preferably some training BEFORE you try to head into the mountains. The experts also recommend carrying a good fuel reserve because airports can be few and far between, especially ones with round the clock services (or services at all for that matter). At least an hour would be a good place to start in setting a fuel reserve. Avweb has an excellent article about how to improve your mountain flying skills (available at <http://www.avweb.com/news/airman/190015-1.html>. *FAA Aviations News* also published an in depth series of articles on mountain flying in the April 2001 issue. Unfortunately, it is not available online. A limited number of copies are available upon request.

Weather in the Mountains

Weather in the mountains is a critical factor. There are a number of weather risks we need to be aware of. Because a comprehensive discussion of these would require more space than this article allows, I'll only mention a couple of examples. You also need to be aware that the weather in the mountain changes quickly and dramatically, so check it early and often, at every stop, and while en route.

The first weather challenge is one of geography. Mountain airports tend to be located on the flattest sections of land available, which tend to be in the valleys between the mountains. Our proposed destination is an example of this. At an altitude of about 6,500 feet Jackson Hole Airport is surrounded by peaks ranging from 9,000 to almost 14,000 feet. According to the Jackson Hole Chamber of Commerce, the term "Jackson Hole" refers



Close-up from sectional depicting the area surrounding Jackson Hole Airport.

to the valley that is about 80 miles long and 15 miles wide, that runs from just south of Yellowstone National Park down to the Snake River at Munger Mountain, south of the town of Jackson. The airport is located 8 miles north of Jackson putting it in the heart of the Jackson Hole valley. This means that a ceiling of 2,000 feet at the airport would mean VFR traffic could not get in or out of this valley. So we must pay special attention to the ceilings in terms of what kind of clearance we might need to get through the pass.

Another weather concern is the common occurrence of updrafts and down drafts. As air moves from one place to another it runs into the mountains we are flying around. With no where else to go, the air climbs up one side and flows down the other. For pilots, this means that on the upwind side of the mountain during periods of high winds you can expect strong up drafts and strong down drafts on the downwind side. These up and down drafts could easily exceed your aircraft's ability to climb away from the rapidly approaching ground in the case of some down drafts. So if you experience strong up drafts while approaching a mountain remember: What goes up must come down. These characteristics also create a lot of turbulence which can sometimes be severe. This can be especially true in passes. By the nature of a pass, you will be surrounded by high ground—a natural funnel of air. At times the only solution to the weather challenges could be to schedule your flights at time periods when the weather is usually more cooperative.

Special attention must be paid when crossing or flying into the mountains, so if you plan to fly in the mountains you owe it to yourself to do some homework. Or better yet get some training. Many organizations offer mountain flying clinics and seminars that for a small cost can provide you with valuable information. One such organization is the Colorado Pilots Association at <http://www.coloradopilots.org/>. But once you take precautions, flying in the mountains can offer you some of the most fun flying and incredible views in the world. The spectacular experience is well worth the time and effort. So please take the time to do your research, if you plan to do mountain flying in the future. You owe that to yourself and your passengers.

National Security Issues

It's important to remember that a large portion of the western United States, because it's rugged and sparsely populated, is basically a giant training ground for the armed forces. A quick scan of the sectional will show many large Military Operations Areas (MOA) and restricted areas along our route. The primary difference between a restricted area and an MOA is that you can enter a MOA at anytime. While this is legally correct, you must ask yourself if it is really that wise. Restricted areas, when they are active, you are not allowed to enter. If there are any restricted areas or MOAs that are particularly close to your route of flight, you may want to ask Flight Service about their status when you call for your briefing. Also be aware of National Security Areas. These areas are depicted with thick dashed magenta lines and have a notice stating something like: For reasons of national security pilots are requested to avoid flight at or below 8,000 feet MSL. They also generally request that you do not loiter around the areas. So if you desire to avoid unwanted Federal attention you would be wise to comply with that request.

Leg One

Now back to the task at hand. This article assumes you have basic skills of calculating headings, times, distances, speeds, and selecting check points, so for each leg I will highlight other challenges to consider.

On the Tucson to Grand Canyon National Park leg, our first challenge is the Phoenix area Class B airspace. Not having flown out in that area I'm not sure how willing the Phoenix controllers would be to let you transition the airspace, so you will have to either go under and around it or over it. Over it seems logical since you will be flying at those 10,000 foot plus altitudes on this trip, so now would be a great time to find out if the airplane will make it. Flying *Warriors*, I know that some days it would fly right up to 10,000 feet and beyond, and other days I couldn't get it up to 10,000 feet

no matter what I did. You also will want to try to avoid major incoming and outgoing airline flight paths. The local Flights Standards District Office or FAASTeam members might be able to help you with this. Beyond Phoenix the terrain starts to rise. You will also have to deal with high temperatures in many cases. As I mentioned earlier in this article, high temperature is a big factor in density altitude.

Arriving at Grand Canyon we will have to be on our toes since there are a lot of air tour operators in the area and we don't want to cause problems. Also, there are restrictions on VFR operations around the Grand Canyon National Park, so check with Flight Service and in your *Airport/Facility Directory* (under Special Notices, Grand Canyon Special Flight Rules Area) to be sure you can comply. This would affect your second leg more directly as it requires you to cross the Canyon, but you should be familiar with the restrictions before even getting near there. This also brings up the point that you are requested to fly at 2,000 feet AGL (Above Ground Level) or better over most parks and conservation or wilderness areas. If nothing else, this is a simple courtesy to park visitors that I'm sure you would like extended to you if you were in the park.

Leg Two

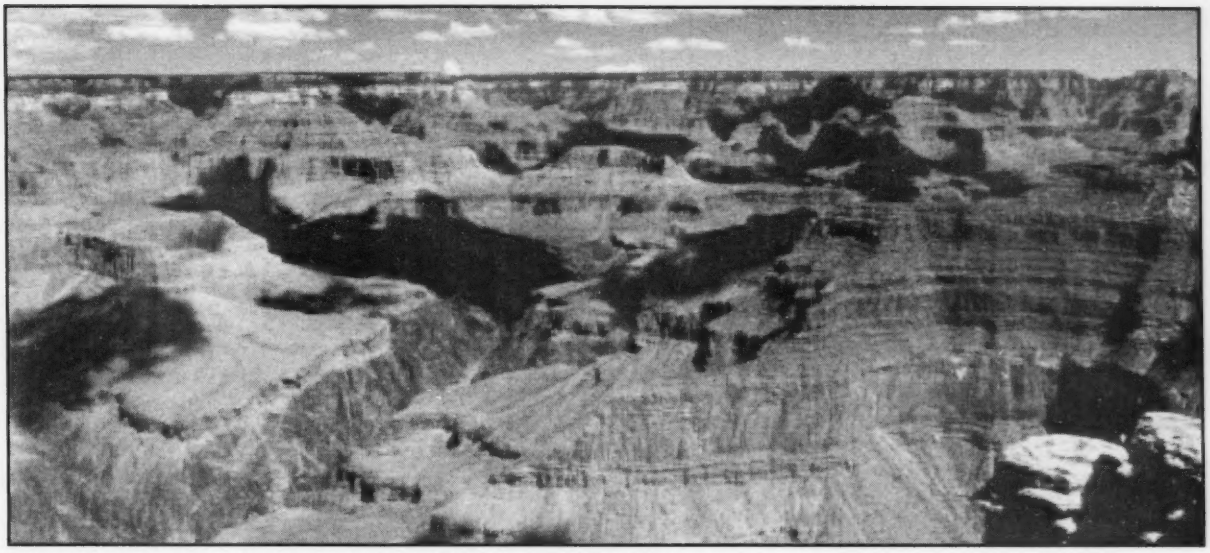
From Grand Canyon National Park to Ogden Hinckley, our first challenge will be the takeoff. With a field elevation of 6,609 feet, density altitude will almost certainly be a factor. Immediately after that we have the airspace around the Canyon which will be full of air tour aircraft, many of them helicopters. To avoid problems, it would be wise to climb up to or near cruise altitude before attempting to cross, especially considering the plateau north of the Canyon is about 9,000 feet MSL. As we move north we have some peaks to look out for and some fairly empty terrain to cross. Our next event will be flying over Salt Lake City. As with Phoenix we can deal with this how ever we feel best works for us. One thing to keep in mind is that while it is perfectly legal to fly over the Class B airspace at say 10,500 feet; that only puts you 500 feet above the airspace and remember that's right where all the airliners are trying to climb through. So it would probably be best to avoid over flights when possible.

Leg Three

On the final leg, from Ogden Hinckley to Jackson Hole, the challenge is high peaks. Heading north northwest allows us to fly over the Great Salt Lake and gain altitude before heading into higher terrain. Heading in the direction of the KREBS intersection would quickly put us back on course. You may ask why I'm using an IFR intersection in a VFR example. The answer is that it is a fixed and recorded point that can be readily identified by at least two sources of information. The first, and probably most likely, is that you could enter that intersection into your GPS and fly to it that way. If that option is not available for some reason, you could then revert to identification by VOR. Either way, you have a fixed point from which to start your trek north. From Malad City you could press on direct to Jackson Hole, but I would advise the other route. That route would take you over Arimo, McCammon, Inkum, and Pocatello in Idaho. This route would require some real VFR navigation, but as Interstate 15 follows that route it should provide a definitive path to follow. The old joke about "I fly roads" may be calling you to be brave and choose a rugged or more testing route forward. But we should be looking for ways to make our flight as safe as possible, instead of removing safe guards in a misguided attempt to prove our abilities as a pilot. In most cases there's a reason why roads are where they are. They are usually situated on low, or lower, and relatively flat ground. They also provide an excellent emergency land strip. In reviewing accident reports a very large number of these reports concern forced landings due to loss of engine power. By landing on or near the roadway you can improve your chances of a speedy rescue and recovery by being close to such a major roadway.

After passing through the valley from Pocatello to St. Anthony we turn west toward Driggs. Driggs would be the last possible stopping point before attempting the Teton Pass. The airport has a long runway (over 7,000 feet) and about 5 miles clearance from high terrain all around. If you are unsure about trying to find the Teton Pass, you may want to land and arrange for a short flight with a local flight instructor to familiarize yourself with the local area. This is no substitute for preparing for mountain flying before you start, but a local guide might give you some reassurance with a minimal delay. Of course, you should call ahead to make arrangements before you leave to insure the FBO on the field would be able to accommodate your request.

The biggest challenge of this leg is the Teton Pass. Being a flatlander, the term mountain pass conjures up images of broad openings between two peaks with relatively flat ground in the middle. Wrong! Looking at the Salt Lake City sectional, the pass looks manageable enough: Teton Pass-8,431 feet. A bit high, but definitely something I can get over. Bounded on the north by over 10,000 foot peaks and more loosely bounded on the south by about 10,000 foot peaks, this is the place to cross. Looking at satellite photos of the pass quickly dispelled my naivety. I thought, "This isn't a pass; these are mountains." They may be shorter, but these are mountains. My point is that just because it's labeled a pass on the chart doesn't mean it would be a place to let down our guard. This also highlights the concept of using satellite images to prepare for your flight. If you are unsure about a certain section, you might decide to scan the satellite photos to give yourself some extra information about what to look for. Duat.com has a new option which allows you to pull up a giant sectional chart of the United States. With this chart you can switch between sectional, map, and aerial photo modes. This allows you to scan your route for potential challenges. This function is



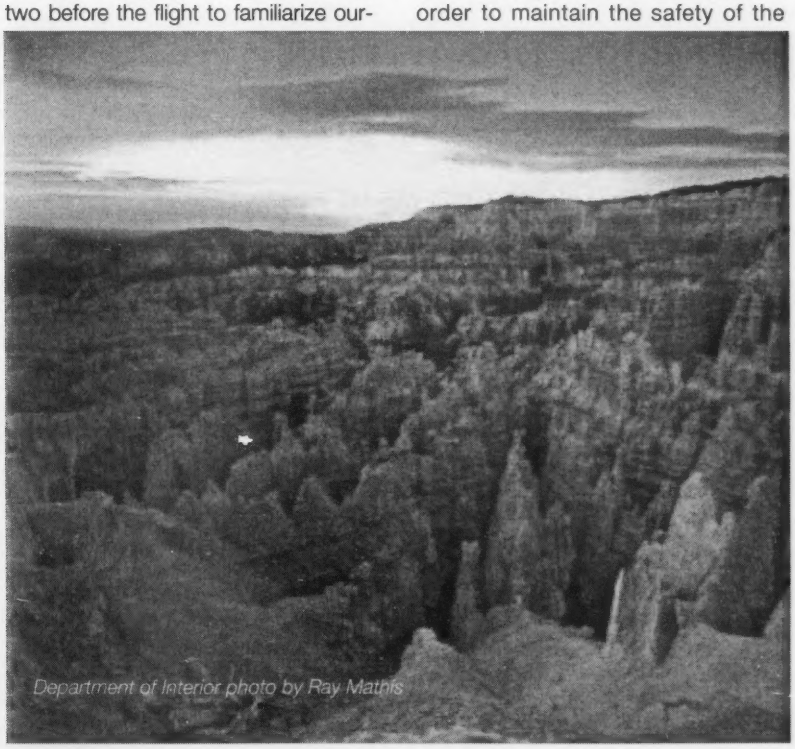
Department of Interior, National Park Service photo

Above: Grand Canyon National Park, and below: Bryce Canyon National Park.

new and may change, but at present this represents a powerful tool for VFR navigation.

Conclusion

Simple preparation can pay huge dividends. By spending an hour or two before the flight to familiarize ourselves with the factors discussed in the proposed trips, and others important to your particular flight, we can have the best possible outcome regardless of circumstances. Knowing what you're about to get yourself into could force you to alter your plans in order to maintain the safety of the flight. Being almost completely a flatlander pilot, the concept of minimum altitudes well above the capabilities of the aircraft was a foreign concept to me. My previous solution to mountains had always been "just go higher." But when the mountain peaks are higher than your service ceiling and the mountains can rise faster than your aircraft can climb, there isn't much you can do. By taking advantage of the resources available to us, we can improve our situations not just in an emergency, but also during the normal flight.

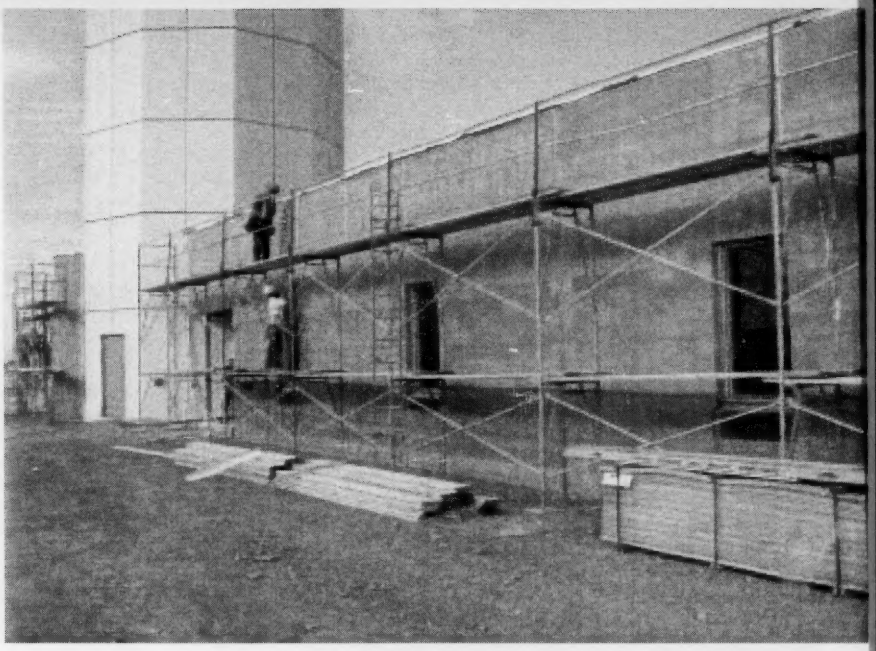


Department of Interior photo by Ray Mathis

In the end, it all comes down to how prepared you should be for your trip. Obviously the shorter the trip, the greater the chances are of completing it without complications. But as trips stretch beyond the simple hop over to the next town, we need to increase our preparations as well. Remember, the cockpit is the last place you want to be fumbling with airport books and charts trying to make an important decision. Or worse yet, you try to push on into something you shouldn't because you don't know what your options are, when emergencies or weather issues force us to deviate. A safe and enjoyable trip, no matter what its length, should be your ultimate goal.

Phoenix Rising: Deer Valley ATCT

by Rob Smuda

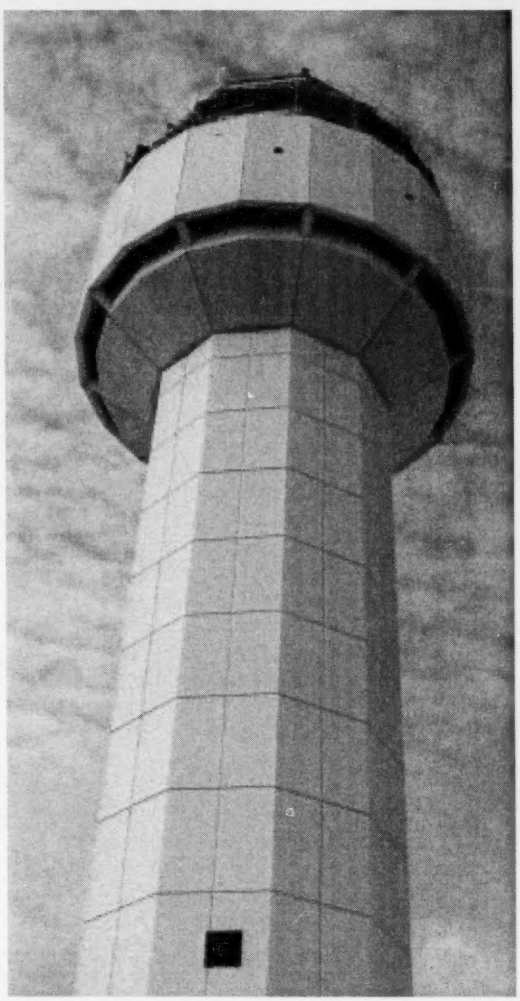


In the mainstream of society, when someone says "airport," they mean a large international airport like Los Angeles International or JFK in New York. But smaller airports out number those airports. There are hundreds of these smaller airports around the country. However, most people don't even know these airports exist, even though they serve a vital function and provide an excellent solution for both commercial and general aviation.

Phoenix has one of these smaller airports on the north side of town. It is an important part of the Phoenix airport system and, by extension, the whole National Airspace System. Deer Valley Municipal Airport plays an important role as a reliever or alternate airport for Phoenix Sky Harbor International (PHX) for general aviation aircraft. In this way general aviation aircraft don't have to jostle for position with the airlines at PHX and both parties end up with a better situation. Deer Valley also happens to be one of the busiest airports in the country including major airports. In 2006 Deer Valley airport had more than 405,000 takeoffs and landings.

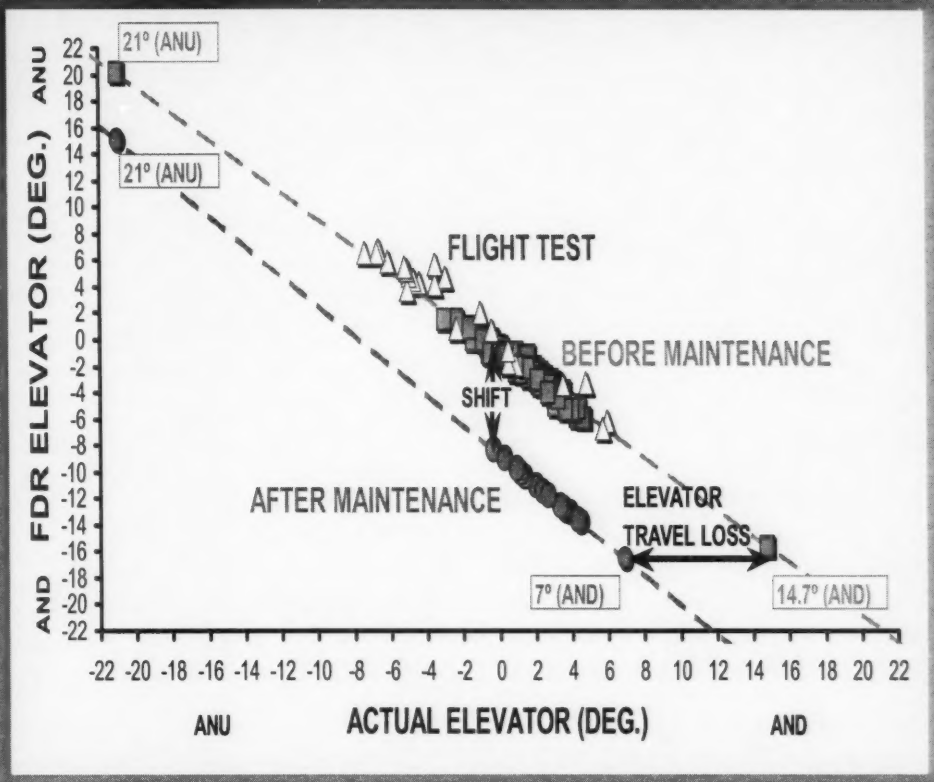
According to the airport's web site, it was originally built in 1960 as a private airfield with only one runway, no control tower, and very few amenities. The city of Phoenix purchased the airport in 1971 and set up a rather humble temporary control tower. In 1975 the airport built a new terminal, which included a full-sized air traffic control (ATC) tower. At that time, the FAA took over providing ATC services. In the following years the airport grew to become a large, full-service general aviation reliever airport, boasting parallel runways of 8,200 and 4,500 feet, respectively, and more than $17 million in improvements.

Today that improvement continues with the construction of a new air traffic control tower. As the airport grew around it, the old control tower at 75 feet no longer functioned as well as when it was designed. The new tower stands 160 feet tall enabling the controllers to have a much clearer view of runways, taxiways, ramps, and airborne traffic. The project started in January 2005 and was completed in early 2007 when the FAA took possession of the tower to begin installing radar, communication, and other essential equipment. The tower was commissioned in April, after equipment interfacing with Phoenix Sky Harbor's new Terminal Radar Approach Control (TRACON).



The envisioning and building of such an impressive control tower as this requires a lot of dedication and hard work by many individuals, teams, companies, and subcontractors. On behalf of the controllers and staff of Deer Valley Control Tower, we would like to extend an open invitation to arrange a visit and tour of the facility.

Rob Smuda is the Frontline Manager at the Deer Valley Air Traffic Control Tower.



Flight Controls, Maintenance, and Fresh Warm Air

What could go wrong?

by James Williams

As the spring and summer flying season starts to get rolling, we need to be aware of certain potential hazards that could cause us great harm, or worse, if left unchecked. Take the flight control check, for example. If you have done it enough times, it becomes repetitive, so are you really paying attention to what you are doing?

There are two possible hazards looming that come to mind. The first is unavoidable: control cables contracting and expanding. This is a function of temperature. It's basic physics, when the temperature gets hotter things expand, and when it gets colder things contract. This principle applies to your flight controls too. So those cables you finally got balanced and tensioned just right last fall, are probably anything but now. Changes in temperature can change the length of these cables leading to slack (or lack of slack) in the cables resulting in "sloppy" controls or in extreme cases the possible loss of control effectiveness.

The other hazard is the chance that something could go wrong during maintenance. Sometimes a mechanic simply makes a mistake, but as one mechanic said, mechanics don't make small mistakes. One small thing left undone can have tragic consequences, so perform a very detailed preflight. The most dangerous time to fly an airplane is probably when it is fresh out of maintenance.

While there are many flight control accidents to choose from, these two 2003 accidents involve Beech 1900D aircraft and are remarkably similar. These accidents do not reflect any de-

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IX - Model 1900D (cont'd)

C.G. Range (Landing Gear Extended)	F.S. 282.9 to F.S. 299.9 at 17,120 lbs. F.S. 274.5 to F.S. 299.9 at 11,600 lbs. or less Straight line variation between points given Moment change due to retracting landing gear (-8966 in.-lb.) For cruise and descent flight phases at weights 12,313 lbs. and above operation is approved to an aft limit of F.S. 303.0.			
Empty Wt. C.G. Range	None			
Maximum Weight	Ramp	17,230 Lbs.		
	Takeoff	17,120 Lbs.		
	Landing	16,765 Lbs.		
	Zero fuel	15,165 Lbs. (See Note 1 and Note 11)		
Minimum Crew	One pilot			
No. of Seats and Cargo Loading	Maximum 21 (including two crew at +129). (See Note 7) See loading instructions in Airplane Flight manual for approved seating and cargo configurations.			
Maximum Baggage	See Note 6 for data on maximum baggage.			
Fuel capacity	Tank	Cap. Gal.	Usable Gal.	Arm
	Main LH	244.7	240.5	296
	Main RH	244.7	240.5	296
	Auxiliary LH	93.3	92.2	304
	Auxiliary RH	93.3	92.2	304
	See NOTE 1(a) for data on unusable fuel.			
Oil Capacity	29 qt. total (includes 12 qt usable in two integral engine tanks) See NOTE 1(b) for data on unusable oil.			
	Maximum Operating Altitude 25,000 ft.			
Control Surface Movements	Wing flap	Maximum 35°		
	Aileron tabs	Up 15°	Down 15°	
	Aileron	Up 24°	Down 17°	
	Elevator tabs	Up 5.5°	Down 16.5°	
	Elevator	Up 20°	Down 14°	
	Rudder tab	Right 15°	Left 15°	
	Rudder	Right 25°	Left 25°	
Serial Nos. Eligible	UE-1 and after. See Note 9.			
Data Pertinent to Model 1900D				
Datum	Located 290.5 in. forward of the wing (forward) spar centerline.			

An example from the Type Certificate Data Sheet (TCDS) for Beechcraft Model 1900D showing controlled surface deflections.

fect or inherent safety problem in the aircraft itself, but rather are just two similar accidents that happened to occur in the same kind of aircraft. All information regarding these accidents was taken directly from the NTSB reports.

Air Midwest Flight 5481 (NTSB/AAR-04/01)

On January 8, 2003, Air Midwest Flight 5481 suffered a loss of pitch control on takeoff from Charlotte-Douglas International Airport. The Beechcraft 1900D aircraft crashed shortly after takeoff, killing 19 passengers, two crew, and one person on the ground. The aircraft crashed into a US Airways maintenance hangar and came to rest about 1,650 feet east of the runway.

The aircraft had been in for maintenance just prior to the accident, from the night of January 6 to the next morning. Specifically, the maintenance completed was the "detail 6" (D6) check which covers the aft fuselage and empennage including the pitch control systems. The airplane completed nine flights after the D6 check before the accident on the tenth flight. The aircraft managed to fly normal service after the D6 check and was handed off to the accident crew with no reports of any problems. The previous first officer during the hand off told the new first officer that "everything was normal" and "it was a good flying airplane."(AAR-04/01, p1)

The NTSB concluded that the probable cause of the accident was: "...the airplane's loss of pitch control during takeoff. The loss of pitch control resulted from the incorrect rigging of the elevator control system compounded by the airplane's aft center of gravity, which was substantially aft of the certified aft limit."(AAR-04/01, p131)

When the elevator control cables were adjusted during the inspection, they were incorrectly rigged to provide a maximum of seven degrees Aircraft Nose Down (AND), which is about half of the downward travel specified by the manufacturer (AAR-04/01, p128). The NTSB calculated that an input of 9.5 degrees AND would have been required to recover from the initial upset. As this was not possible, the flight was doomed as soon as it took off. In this case, it was a combination of an excessively aft center of gravity (CG) and limited control authority that lead to this loss. As the circumstances around this flight show, the aircraft was flyable with a CG within limits. It flew fine on the previous nine flights following maintenance. These flights included ones flown by the accident crew and at least one other crew. Neither of these crews discovered the incorrectly rigged pitch controls, and clearly from the comments cited above, there was no sense of any abnormal situation with regard to the aircraft. The loss of control would not have occurred without the aft CG, but the aircraft would have likely been controllable with the aft CG had the crew been able to exercise full authority over the downward travel of the elevator. It's possible the crew might have been able to recover from the upset and return to the field. But the fatal combination of aft CG and reduced control travel left the crew with no ability to avert disaster.

Colgan Air Flight 9446 (NYC03MA183)

On August 26, 2003, Colgan Air Flight 9446 attempted to take off on a flight from Barnstable Municipal Airport in Hyannis, Massachusetts, to Albany International Airport in Albany, New York. During the takeoff roll, the pitch trim system began to move in the downward direction. The initial movement speed from 1.5 degrees AND to 3.0 degrees AND was consistent with the electric pitch trim motor. Four seconds later the pitch trim movement increased from 3.0 degrees AND to 7.0 degrees AND at a speed

that was beyond the capacity of the electric motor. The crew declared an emergency, reporting runway trim, and attempted to return to the airport. The flight reached 1,100 feet while attempting to return to the airport. "Witnesses observed the airplane in a left turn, with a nose-up attitude. The airplane then pitched nose-down and impacted the water 'nose first.'"(NYC03MA183) Only the flight crew was on board the aircraft, both were killed.

The accident aircraft had been brought in for its D6 check on August 23. On the morning of August 24 the check was interrupted and the remaining work was deferred. Ten revenue flights were conducted. The evening of August 24th the aircraft was returned for completion of the D6 check which was concluded on the 26th. Extensive work was done on the pitch trim tabs and trim control system (Check the report for specifics). After takeoff the crew reported the runway trim and manually selected Aircraft Nose Up (ANU) trim settings, but the aircraft trimmed full AND. The control column force was measured at 250 pounds, but the crew was unable to maintain control.

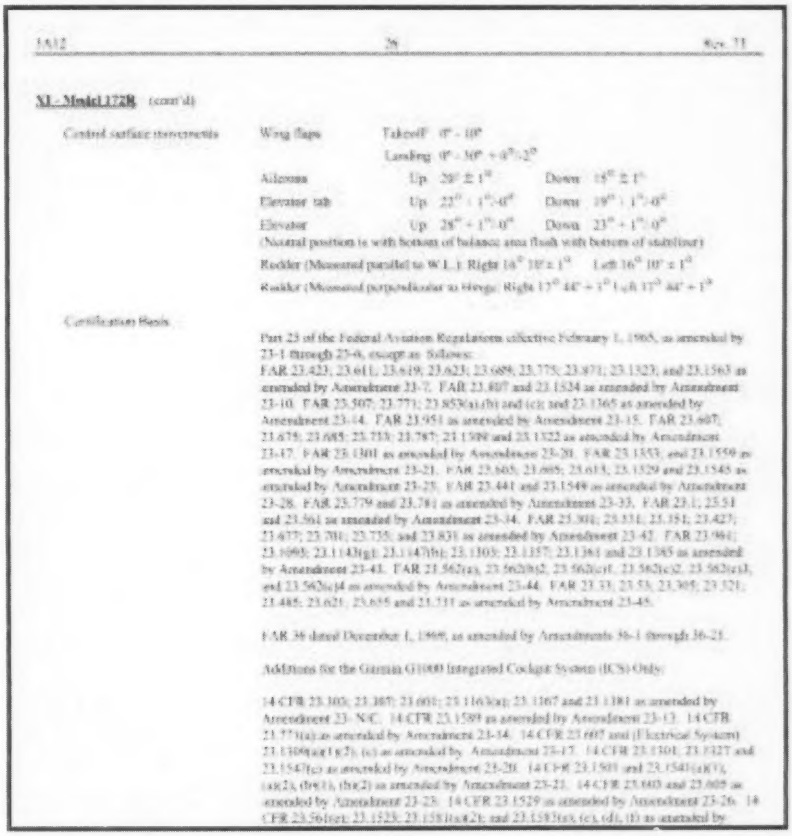
"The Safety Board performed a mis-rigging demonstration on an exemplar airplane, which reversed the elevator trim system. An operational check on that airplane revealed that when the electric trim motor was activated in one direction, the elevator trim tabs moved in the correct direction, but the trim wheel moved opposite of the corresponding correct direction. When the manual trim wheel was moved in one direction, the elevator trim tabs moved opposite of the corresponding correct direction." (NYC03MA183)

The NTSB determined that the probable cause of the accident was:

"The improper replacement of the forward elevator trim cable, and subsequent inadequate functional check of the maintenance performed, which resulted in a reversal of the elevator trim system and a loss of control in-flight." (NYC03MA183)

Because the crew did not perform a first flight of the day check, as company policy and manuals required, they were unaware of any problem. The replacement of the elevator trim cable was noted in the aircraft release paperwork, but no mention of that was made by the crew. Several non-pertinent conversations were noted in the transcript of the Cockpit Voice Recorder (CVR). With the flight being empty it is possible the crew may not have been as conscientious as they would be if there were passengers on board. The NTSB cited "...the flight crew's failure to follow the checklist procedures..." as a factor in this accident.

The point of the preceding examples is flight control malfunctions/ maintenance errors happen. Airlines have professional maintenance organizations that usually specialize in, or have specialized training on, the make or model of aircraft they are servicing. Almost all GA mechanics are very professional and have extensive training, but in most cases they are more generalistic. This is the only practical system. While they have probably worked on most models, they may not have worked on your particular version or model. Most airports can't support specialized mechanics only for Cessna, Piper, Cirrus, Beechcraft, Mooney, and several other manufacturers – not to mention all of the different avionics and engine suppliers. So if you fly a Cessna 172, almost any mechanic probably knows it front to back, but if you fly a Socata Tampico (or any of a number of less popular aircraft) you might be out of luck. As a practical matter, these generalist mechanics are a perfect solution in realistic terms. Title 14 Code of Federal Regulations (CFR) section 43.13 (a), which covers performance rules for mechanics, states:



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XI - Model 172R (cont'd)

Control surface movements

Wing flaps: Takeoff 0° - 10°; Landing 0° - 30° + 0° - 2°

Ailerons: Up 20° ± 1°; Down 15° ± 1°

Elevator tab: Up 22° + 1° - 0°; Down 19° + 1° - 0°

Elevator: Up 28° + 1° - 0°; Down 23° + 1° - 0°

(Neutral position is with bottom of balance area flush with bottom of stabilizer)

Rudder (Measured parallel to W.L.): Right 16° 10' ± 1°; Left 16° 10' ± 1°

Rudder (Measured perpendicular to Hinge): Right 17° 44' + 1° (-0, 17° 44' + 1°

Certification Basis

Part 23 of the Federal Aviation Regulations effective February 1, 1965, as amended by 23-1 through 23-6, except as follows:
FAR 23.423; 23.611; 23.619; 23.623; 23.689; 23.775; 23.871; 23.1323; and 23.1563 as amended by Amendment 23-7. FAR 23.807 and 23.1524 as amended by Amendment 23-10. FAR 23.507; 23.771; 23.853(a),(b) and (c); and 23.1365 as amended by Amendment 23-14. FAR 23.951 as amended by Amendment 23-15. FAR 23.607; 23.675; 23.685; 23.753; 23.787; 23.1309 and 23.1322 as amended by Amendment 23-17. FAR 23.1301 as amended by Amendment 23-20. FAR 23.1353, and 23.1559 as amended by Amendment 23-21. FAR 23.605; 23.695; 23.615; 23.1529 and 23.1545 as amended by Amendment 23-23. FAR 23.441 and 23.1549 as amended by Amendment 23-28. FAR 23.779 and 23.781 as amended by Amendment 23-33. FAR 23.1; 23.51 and 23.561 as amended by Amendment 23-34. FAR 23.301; 23.331; 23.351; 23.427; 23.477; 23.701; 23.735; and 23.831 as amended by Amendment 23-42. FAR 23.901; 23.1093; 23.1143(g); 23.1147(b); 23.1305; 23.1357; 23.1361 and 23.1365 as amended by Amendment 23-43. FAR 23.562(a); 23.562(b)2; 23.562(c)1; 23.562(c)2; 23.562(e)3; and 23.562(e)4 as amended by Amendment 23-44. FAR 23.33; 23.53; 23.305; 23.321; 23.485; 23.621; 23.655 and 23.731 as amended by Amendment 23-45.

FAR 36 dated December 1, 1969, as amended by Amendments 36-1 through 36-23.

Additions for the Garmin G1000 Integrated Cockpit System (ICS) Only:

14 CFR 23.305; 23.307; 23.601; 23.1163(a); 23.1167 and 23.1181 as amended by Amendment 23- N/C. 14 CFR 23.1589 as amended by Amendment 23-13. 14 CFR 23.777(a) as amended by Amendment 23-14. 14 CFR 23.697 and (Electrical System) 23.1309(a)(1)(2), (c) as amended by Amendment 23-17. 14 CFR 23.1301; 23.1327 and 23.1547(c) as amended by Amendment 23-20. 14 CFR 23.1301 and 23.1541(a)(1), (a)(2), (b)(1), (b)(2) as amended by Amendment 23-23. 14 CFR 23.603 and 23.605 as amended by Amendment 23-25. 14 CFR 23.1529 as amended by Amendment 23-26. 14 CFR 23.561(a); 23.1523; 23.1581(a)(2); and 23.1583(a), (c), (d), (f) as amended by

A similar section from the Cessna C172 TCDS.

"Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator,..."

Title 14 CFR section 65.81(a) tells us mechanics are required to have performed any maintenance task successfully, under supervision, before they can do it on their own. Most mechanics probably do not get a chance to practice every procedure, on every type of aircraft, on a regular basis. But with strong general skills and guidance provided by the manufacturers, GA mechanics do a superb job keeping the fleet running. The point is, if a crew with extensive specialized training can make mistakes, as was the case in both of these accidents, then there is the chance that any mechanic could do the same.

On the other side of the coin, professional, trained flight crews failed to notice any problem until it was too late. Again, these were flight crew trained to Airline Transport Pilot standards (at least the captains) which are far more rigorous, with greater frequency requirements, than most GA pilots face. Most airline pilots also fly more frequently than many GA pilots, leading to greater proficiency. They also have access to higher quality simulators to practice emergency procedures with far greater fidelity. Yet in these accidents they failed to detect any problem. In the first case, the problem may have been more difficult to detect. In the second case, the failure to do a thorough preflight and before takeoff check eliminated any chance for detection. What makes the second case especially troubling is that the aircraft came directly out of maintenance with notations about what had been done. Every sign was there to alert the crew to the potential for a problem with the elevator trim. So they should have been paying attention and done a much more thorough check of the pitch control and pitch trim systems. Would you be able to recognize a problem if you saw one? At least three airline crews didn't (one crew for the Colgan accident and at least two crews for the Air Midwest accident).

In GA, our airplanes may be less complicated, but the question remains: Would we even know if things weren't as they should be? We can generally determine whether or not things are pointing in the right directions. But would we notice a more subtle defect in the rigging? In the case of the Air Midwest accident, it was an incorrect rigging that likely would have been hard to detect. The error cost the crew just enough to make the accident inevitable. While a confluence of factors had to come together to make this happen, it is a situation that most GA pilots can probably envision for themselves. You're getting ready for a big trip. You called your local Fixed Base Operator (FBO) to arrange for an aircraft rental (I specify a rental here because that would be more akin to the environment of an airline where pilots don't have a single airplane they always fly, but the same situation is possible with an aircraft owner) for the next few days to visit friends or relatives a few hundred miles away. As a favor to you, just trying to be a good service provider, the FBO assigns you an aircraft fresh out of maintenance with a clean annual/100 hour inspection. You carefully work out the weight and balance for you and your three compatriots, bags, and other items. At the last minute, one of your passengers loads a bag in the rear that they forgot to mention to you while you were inside taking care of one thing or another. Many passengers probably wouldn't have an understanding of CG or Max Gross Takeoff weights. Now you've just found yourself in the same situation as the Air Midwest crew, a hopeless one if you take off.

The old analogy, accidents happen when the holes in the Swiss cheese of our safety nets line up precisely, is likely to remain correct regardless of our efforts. Our goal is to reduce the size of the holes and improve our chances of survival. While we can't say with any certainty that any preflights done were improper or inadequate, the NTSB report in one case suggests that the crew did not follow the operating checklists very closely. In the case of the Air Midwest accident, it may not have helped at all. In the case of the Colgan accident, the crew was not as careful or thorough as they should have been considering that the aircraft just rolled out of maintenance. According to the report, the captain noted the inoperative Digital Flight Data Recorder (DFDR) but made no mention of the freshly replaced elevator trim cable that was listed in the same paperwork.

This time of the year you are probably thinking about what to do on your summer vacation. What we can learn from these deadly accidents is the need to be especially vigilant with aircraft coming out of maintenance. Maybe we should do a thorough control preflight when we know the rigging is right to get a mental picture of what full deflection should be. One extra step you might consider taking is reviewing the Type Certificate Data Sheet (TCDS) for the aircraft you normally fly. These documents contain the proper deflection angles for any aircraft. They are available for free from the FAA at <http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgMakeModel.nsf/MainFrame?OpenFrameSet>. This information, combined with a simple grade school protractor, would allow you to insure your flight controls are as they should be. Insuring our own safety, and that of our passengers, is about making every possible effort to gain maximum advantage. This stresses the need for a greater understanding of how flight controls (or any other critical system) really work and how they might be affected by maintenance or changes in conditions. This understanding, along with a professional dedication to do more than a cursory preflight, will help us reduce the risks we naturally face in our pursuit of flying.

Midair

by H. Dean Chamberlain

In September 2006, while working at the Reno (Nevada) National Championship Air Races, I was told about the midair collision between a glider and a business jet. It occurred in the greater Reno area about 10 miles west-northwest of Smith, Nevada, the month before. As a rated glider pilot, I was immediately interested in finding out the details of the accident. I talked with the FAA aviation safety inspectors from the Reno Flight Standards District Office (FSDO), who were working at and monitoring the air races. I also met and discussed the accident with Marvin Rogge of Rogge Insurance Services Aviation, Las Vegas, Nevada. He is an independent insurance adjuster who worked on behalf of the insurance company that insured the glider involved in the accident. Later, I drove to the Carson City, Nevada, airport to look at the damaged business jet, a Hawker 800 XP. Although I had seen Rogge's photographs of the damaged jet on the runway after its gear up landing, as well as those on the Internet, the aircraft I saw in a Carson City hangar was sitting on its gear with all of its damaged airframe areas covered with black plastic sheeting and tape. Photographs of the damaged jet were widely displayed on the Internet at the time of the accident including the damaged cockpit with the glider wing spare protruding through the jet's instrument panel.

In writing this article I reviewed the two National Transportation Safety Board's (NTSB) accident reports listed on the NTSB's Aviation Internet site. The reports, *Preliminary Report Aviation NTSB ID LAX06FA277A and NTSB ID LAX06FA277B,* for each aircraft involved in the accident describe what happened, list statements of the pilots involved, report damages to each aircraft, and provide a weather condition report for the time of the accident. The two reports are available for review on the NTSB Internet site at <www.ntsb.gov>. Because both reports are preliminary reports, each is subject to change.

To sum up the August 28, 2006, accident, at 1506 Pacific daylight time, the glider was destroyed in the midair accident and the severely damaged Hawker later landed gear up in Carson City, Nevada. Fortunately, everyone onboard both aircraft survived. I heard several differing accounts of how the Japanese glider pilot survived the initial impact that destroyed the glider's right wing. The glider's wing spar then penetrated the jet's nose cone and cockpit. What I thought amazing was how the glider pilot was able to extract himself from the mortally wounded glider that was in a flat spin and parachute to safety. Since not every glider pilot wears a parachute—Federal regulations don't require a glider pilot to wear a parachute—the fact the pilot not only wore parachute, but was able to exit the glider and get a good canopy and land without major injury in the mountains, give what I think is new meaning to "always be prepared."

Based upon various unofficial reports and the NTSB preliminary report—remember the National Transportation Safety Board (NTSB) final report is the only official source—the accident apparently occurred as the jet was descending into the Reno area on an Instrument Flight Rules (IFR) flight plan from Carlsbad, California, to Reno. At the same time, the glider was soaring in the Pine Nut Mountains east of the Carson City/Minden area on a personal flight without a flight plan. The glider was not required to have a flight plan. Minden is a world famous soaring area south of Carson City, the Nevada state capital, and Reno. According to the NTSB report, the glider pilot reported he had not flown in the Minden area since 2000. On the day of the accident, he received a flight review in a DG-505 the morning of the accident and then flew his first flight in the accident glider. He started his second flight in the glider at 1300 with the intent to fly about five hours in the glider. According to the NTSB report, the glider entered a thermal [Editor's note: A rising column of air that permits a glider to climb.] on the southwest side of Mount Seagul. The glider was in a 30-degree left bank spiraling climb at 50 knots. While in the climb, the glider pilot saw the jet coming toward him. According to the report, the glider pilot "...estimated that one second passed between the time he noted the jet aircraft and the time they collided. He said he may have entered a slight nose down control input, but it wasn't enough to avoid the collision."

The midair occurred at approximately 16,000 feet as the jet was descending into the terminal area in preparation for landing at Reno.

As I understand the details of the accident, there was some question about what the jet hit on its descent. But based upon the air traffic radar tapes, the time of the accident and the altitude when the jet's position changed, air traffic controllers and rescue forces were able to determine a starting point for searching for the missing glider and its pilot. In time, the glider pilot was found walking out the mountains. However, it is my understanding that it took some time before a search was initiated because the glider was being flown without a flight plan.

As we await NTSB's official acci-

dent report, I want to add my personal thoughts on this accident because it highlights what I think are several important, although highly controversial, safety issues within the glider/soaring community.

To paraphrase Title 14 Code of Federal Regulations (14 CFR) section 91.113(b) Right-of-way rules: Except water operations, when weather conditions permit, all pilots have a responsibility to see and avoid other aircraft. Although all pilots are taught this rule, in my opinion, aircraft cockpit design; condition or status of flight; pilot work load; aircraft size; whether flying straight and level or maneuvering; or climbing or descending; type of flight plan, if any; and whether you are talking to air traffic control or not at all; or if the pilot is heads down programming the latest GPS super tech box, all of these or any combination can contribute to a pilot's lack of situational awareness and ability to comply with the above regulation. In this case, I think the relative speed differential between a climbing glider in a 30-degree turn at 50 knots and a descending turbojet may have been a contributing factor. Although both pilots had a regulatory requirement to see and avoid the other, in some situations, by the time you become aware of the danger, it may be too late to avoid it. Although a glider, by regulatory definition has right-of-way over an airplane, 14 CFR section 91.113, Right-of-way rules: Except water operations, this fact did not prevent this accident. According to the NTSB report, the Hawker's captain reported, "...they were cleared to descend and as she looked outside she noted something out of the left corner of her eye to the left. As she looked to the left, she noted a glider filling the windshield. She moved the control yoke down and to the right in an attempt to avoid the glider, but to no avail."

What might have prevented this accident?

The following is a very controversial personal opinion; however, I would be remiss if I didn't bring it up. I was told the glider had a transponder installed, but that it was not turned on. The NTSB notes this fact. Discussions with other glider pilots about the accident provided a possible explanation about why the transponder was turned off: It might drain the glider's battery. Some gliders have small battery packs installed to energize some instruments and flight items, such as radios or GPS units. Such packs have a limited amount of charge and functional usage. Many of these battery packs use rechargeable batteries. In this accident, the NTSB report stated that, "According to the glider pilot, he did not turn on the transponder because he was only intending on remaining in the local glider area, and because he wanted to reserve his batteries for radio use." Although the glider had two battery packs, the pilot reported he was unsure of the remaining charge because of the previous glider flights.

The reason transponder usage is a controversial issue within the glider community is that the FAA's regulations do not require transponders in aircraft which were not originally certificated with an engine-driven electrical system or which has not subsequently been certificated with such a system installed. Because of the certification issue, certain gliders are exempt from the transponder carriage requirement of 14 CFR section 91.215, ATC transponder and altitude reporting equipment and use. What makes this accident interesting is the requirement in the rule that says in part that each person operating an aircraft equipped with an operable ATC transponder maintained in accordance with section 91.413 of this part shall operate the transponder.... So the question in my mind is: Since the glider had a transponder installed—I don't know its maintenance status—does the rule require it to be operating? I think this question may have to be decided by attorneys at some point in the future.

Could an operating transponder have prevented this midair collision? I don't know. But if I was in a glider with an operable transponder, I would rather have it turned on and operating than not. I think anything that might prevent an accident is better than nothing. Is a transponder foolproof? No, but both air traffic control and many aircraft can detect transponder signals. The Hawker was equipped with a TCAS warning system which can detect a transponder signal. I want the world to know I am there. But there are many people in aviation who are opposed to any regulatory change that requires new equipment. Some people are just opposed to any rule change, others oppose change because of the resulting equipment cost, and some feel that having to add extra items to their aircraft may restrict performance. Some, I think, also believe in the big sky-small aircraft theory, which equates into "it can't happen to me." This accident proves the sky is not as big as it once was, and it is getting smaller every year. With the development of the Automatic Dependent Surveillance-B (ADS-B), system, there may come a time when everything that gets off the ground will have to have some type of transponder onboard to be visible to air traffic control. But that is another story.

So what other personal comments did I hear or think about this accident?

First, I think both the glider pilot and the jet crew did a fantastic job after the accident. I think the glider pilot's presence of mind to be able to get out of the glider and successfully operate his parachute and make a safe subsequent landing was great. After looking at the photographs of the damaged jet, I still can't believe the flight crew was able to successfully control and land the aircraft. The fact the crew avoided serious injury is amazing. The plane's captain suffered a facial cut, and she was transported to a facility for medical treatment.

I think this accident reminds all of us of the need for constant vigilance while flying. Although I believe in transponders, we can't become dependent upon air traffic control or our onboard detection systems to warn us of all nearby traffic. An aircraft may not be required to have a transponder onboard or it may be inoperative. So we have a constant need to see and avoid other aircraft when conditions permit. The same need applies to ra-

dios: Listening to air traffic control departure or arrival frequencies can give every pilot an idea of controlled traffic in the immediate area and what that traffic may be doing.

I also think it is important for pilots to know where there may be high levels of unique aviation activity—such as glider operations, parachuting, ultralight flight or even high levels of basic student training—and to be more aware of the need for see and avoid of what may be much smaller aircraft or even skydivers in free fall or under canopy. VFR sectional charts and the *Airport/Facility Directory* appropriate for the area are good starting points in your preflight planning search. All of these aviation activities can be found at differing altitudes. Gliders, for example, particularly in the Minden and other mountainous areas, can be found above 18,000 plus feet altitudes when mountain wave conditions exist. Many parachutists routinely start more than 12,000 feet high to maximize their free fall time.

One interesting comment I heard in Reno concerned the glider pilot's decision to start walking away from the crash site after waiting one and a half hours after the crash. He had walked more than two hours towards Carson Valley before being picked up by local authorities. Although the traditional wisdom says to remain with the aircraft because it is easier for rescuers to find an aircraft than an individual, at times it may be best to walk to safety. Rogge believes that glider pilot knew the area in which he was flying and knew which direction to seek help. According to an e-mail message *FAA Aviation News* received from Rogge, he said, "The terrain was not severe either, as the recovery vehicles drove almost to the site."

Since each situation is different, I won't try and second guess this pilot's decision to walk out. But, some of the FAA aviation safety inspectors I talked with pointed out an important safety item concerning their remote areas around the Reno area. They said the pilot could have walked in the wrong direction for days without ever finding help. The inspectors made a point that pilots should pay attention to where help can be found as they fly along. I think this can be summed up as not only maintaining situational awareness in flight, but also along the ground.

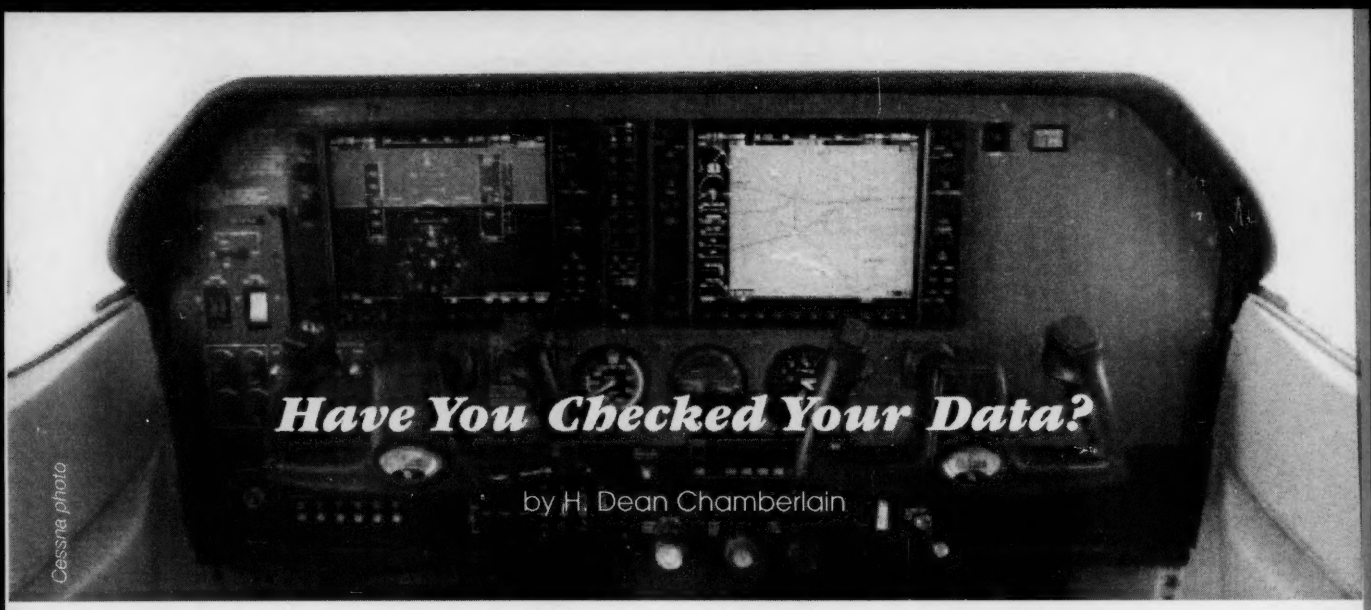
In the chaos following an accident, I think knowing where you are and taking the time to make the best decisions possible under the circumstance may become critical in life or death situations. It helps if you have a compass, a current flight chart, and a survival kit. Your ability to use them may make the difference between surviving or not. As the person I purchased my parachute from notes in his sales material, if you have to use your parachute, you are only going to take with you what is attached to your parachute. He then offers for sale a small basic survival kit that attaches to the webbing of a parachute. As he points out, items loose in your pockets or stuffed in the back of your glider or aircraft may not land with you. Enough said.

In concluding this article, the safety message I want to leave with everyone is the need for constant surveillance when flying. As we start the 2007 summer flying season, let's all pay extra attention for that unexpected aircraft or skydiver that might streak across our flight path. Let's not meet by accident. Have a safe 2007.

SUGGESTIONS ANYONE?

Even though the *FAA Aviation News* is now in its 46th year, we strive to continuously improve the magazine and meet the needs of our customers. We are always interested in your feedback. Please let us know if there is a specific topic you'd like us to cover, or if you think a different format would be more effective.

Please e-mail your comments or suggestions to
AviationNews@faa.gov



Cessna photo

Have You Checked Your Data?

by H. Dean Chamberlain

As flying evolves, we constantly add items to our list of things to do before we can go flying. We have to check weather. We have to check our paperwork——current medical, current flight review, required number of takeoff and landings if we want to be pilot in command and carry passengers, instrument currency, and the list goes on. With the advent of global positioning (GPS), we now have to add other piece of information to our list of things to check. We now have to ask Flight Service for GPS *Notices to Airmen* (NOTAMs) if we plan on using GPS in flight. Please note: Flight Service does not provide GPS NOTAMs without being asked. Add Receiver Autonomous Integrity Monitoring (RAIM) availability along your route and destination to your required list of information if you are planning on flying a GPS approach, for example.

But if you are using an FAA-approved, installed instrument flight rules (IFR) capable GPS in your aircraft, when was the last time you reviewed your data service provider's notification process to verify the accuracy of the service provider's data? Have you ever checked with your data service provider to verify the accuracy of the data you are trusting for your flight's safety?

This question recently came up in a discussion, when an aviation safety inspector in the General Aviation and Commercial Division commented on a recent change to the *Aeronautical Information Manual (AIM)*. The change, AIM Chap.1, Para. 1-1-19(f)(1)(c)(1), referred to the need for IFR pilots to review important safety information before a flight using an IFR GPS unit. Then AIM Chap.1, Para. 1-1-19(f)(1)(c)(1)(b) says to "Verify that the database provider has not published a notice limiting the use of the specific waypoint or procedure."

The point of the discussion was how many IFR pilots check all available information required for a safe flight while using GPS. Checking for any FAA GPS NOTAMS is one check. The RAIM check is another. Having Wide Area Augmentation System (WAAS) at the time of an approach is a third. In our discussion, we noted the most common check was for the current data cycle dates. Maybe the reason the cycle check is always done is because it is one of the automatic checks the GPS unit makes when turned on. Pilots are then asked to confirm that currency by manually pushing the enter button or its functional equivalent. But no one was willing to say how many IFR pilots routinely check the accuracy of the IFR data base installed in their GPS units. Data accuracy is not the same as cycle currency.

The regulatory basis for requiring a pilot to check all available information before a flight is Title 14 Code of Federal Regulation (CFR) section 91.103, Preflight action. The AIM then reminds pilots of that requirement. But the AIM does not tell how or where a pilot can find the information regarding data accuracy.

The short answer is to check with your data source provider. Having said that, if your data source provider is Jeppesen®, your search is easy. Jeppesen®, one of the major data and chart providers in the world, provides its own alerting service to warn those who use its services of problems. One of its services, NavData® Alert, is one of the means used to warn users. As noted on the NavData® Alert, the service is provided to avionics companies and other raw data users, and airlines receiving data direct from Jeppesen®. The information is not provided to individual pilots.

The good news is Jeppesen® provides NavData® Alert information on its Internet site at <www.jeppesen.com>. Anyone can review the Jeppesen® information. A review of the site included an "URGENT" NavData® Alert about incorrect coordinates for a waypoint. In addition to its NavData® Alert, Jeppesen® publishes its own weekly NavData® NOTAMs service. It also produces Jeppesen® NavData® Notices. If your data source provider is Jeppesen®, you now know how to find its data related pages.

If your data source is not Jeppesen®, you should review the information provided by your GPS equipment manufacturer about how to find updated information about your data source provider and how to determine if in fact you have "...all available information concerning that flight." ✈

From left, Mr. Indulis "Andy" Ozols, National FAASTeam Manager Kevin L. Clover, FAASTeam Program Manager (Washington FSDO) Karen Arendt, Mr. John Malcolm Billings, and Mrs. Barbara Billings.

Wright Brothers "Master Pilot" Awardees

Story and photos by Mario Toscano

In a ceremony March 1, at FAA's Washington, DC, headquarters, John Malcolm Billings and Indulis "Andy" Ozols received the coveted Wright Brothers Master Pilot Award. The National FAA Safety Team (FAASTeam) Manager, Kevin L. Clover, presented the awards. In addition to family and friends of the awardees, Flights Standards Service Director Jim Ballough and Eastern Region FAASTeam Program Manager at the Washington Flight Standards District Office (FSDO) Karen Arendt attended the ceremony.

The two award recipients are recognized for their extensive and varied aviation careers, each spanning more than 50-years and twenty-thousand plus hours of experience in military, civilian, airline, and general aviation operations.

Andy Ozols soloed at Brainard Field, Connecticut, on January 4, 1955, in an Aeronca *Sedan*. In 1966, just six years after receiving his U.S. Army aviator wings at Fort Rucker, Alabama, Andy took a position with Eastern Airlines as a Flight Engineer, thus commencing a diverse airline career of twenty-three years. He retired from Eastern Airlines in 1989.

Andy continues to play an active role in general aviation as a Designated Pilot Examiner for the Washington Flight Standards District Office (FSDO). He promotes youth in aviation through his work with the Experimental Aircraft Association's Young Eagle Program. In 2001, Andy received the National Association of Flight Instructor's (NAFI) Master Instructor designation for his commitment to excellence and professional growth as an aviation educator. Andy holds seven flight in-

FAA's Flight Standards Service Director Jim Ballough, center, with "Master Pilot" awardees Indulis "Andy" Ozols, left, and John Malcolm Billings.

structor ratings, five Airline Transport Pilot ratings, and is type rated in the B-727, CE-500, DC-3, and BV-44 fixed-wing aircraft and holds type-ratings in the Bell Helicopter BH-204 and BH-206 rotary-wing aircraft. Andy and his wife live in Stafford, Virginia.

John Malcolm Billing's first flight was a birthday present from his dad in August of 1926. It was a Curtis Robin and he was only three-years old. Seventeen-years later, John soloed in a PT-19A during U.S. Army Air Corps training in Coleman, Texas. He earned his wings and commission in June of 1944 in Frederick, Oklahoma. During his two-year military assignment, John flew ferry, combat, and training missions in the B-24 throughout the United States and Italy. After his release from active duty in February 1946, John served a couple of years with the Army Air Corps Reserve as a flight instructor before joining the airlines. In his thirty-five year career, John flew early piston aircraft, including DC-3, DC-6, DC-7, Martin 404 aircraft, the turboprop *Elektra*, and finally the DC-9 with Eastern Airlines until his retirement in 1983. John Billings cultivates his love of general aviation as an aircraft owner and glider pilot, and currently performs volunteer medical missions for Angel Flight. John and his wife live in Woodstock, Virginia.

The Wright Brothers Master Pilot Award

The Wright Brothers Master Pilot Award recognizes the efforts of pilots who have followed, and continue to follow, the precaution and awareness of safe operations. Most of all, FAA recognizes pilots who have contributed to and maintained safe flight operations for 50 or more consecutive years of piloting aircraft. The award recipient receives a certificate and lapel pin. The FAA Administrator signs the award certificate. A smaller version of the pin is awarded to the spouse, if appropriate.

Eligibility

To be eligible for the award, the applicant must have held a U.S. Civil Aviation Authority or FAA pilot certificate:

- With 50 consecutive years or more civil experience, or up to 20 years of military experience, in combination with civilian experience, to total 50 consecutive years.
- Have three letters of recommendation from holders of FAA pilot certificates.
- Have been a U.S. citizen for the 50 consecutive years.
- Revocation of any airman certificate will disqualify a nominee for this award.
- Prior accident history will be considered and may be disqualifying.
- Civil penalty or suspension will automatically disqualify a nominee for this award.

To Apply

Applicants must submit the following information to their local FSDO FAASTeam manager:

- Three letters of recommendation from FAA pilot certificate holders.
- Photocopies or proper documentation describing the kind of certificate(s) held, including the original issue date(s), if available.
- A detailed description, resume, or summary of the applicant's flying history.
- Completed Master Pilot Award Application Form, which can be found at <www.faa.gov/safety/awards/>.

Selection Process

When the completed application is sent to the local FSDO, a selection committee will be established to review the submitted material and select qualified individuals for this award. More information, or an interview by the committee, may be necessary to verify the applicant's qualifications. This committee will act as the final authority in determining eligibility for the award. The award will be presented at a suitable FAA or industry function to help build personal pride, within the profession, of safe aviation practices.

Contact your local FAASTeam manager for more information on this exciting, prestigious award! For more information, visit the FAA FAASTeam's Web site at <www.faasafety.gov>.

Why I Became an AME

Our vocation is a privilege with great rewards beyond all material wealth and prestige

By Parvez Dara, MD

Why did I want to become an aviation medical examiner (AME)? The short answer: My AME. He had built the scaffolding of my desire and the muscle of want flexed its need, and there I was, thinking of ways to be a part of this elite group.

When? I think I can nail the timing to the day of my first flight physical. It was four in the afternoon when I sat in my AME's office. He was a congenial fellow, full of smiles and easy talk, comfortable in his demeanor. He sat behind a desk with his arms folded behind his neck, beaming with energy. We got to talking and it was all about airplanes. His chariot was a Piper with a speed that could transport him from the East to the West Coast in two or three days. His description of those multiple journeys is chronicled in my brain because his attention to detail was exquisite. He never flew in the clouds, and if they hampered his progress, he either sat them out or got out of the way.

Doing AME's work was the best part of his day, he would say. After his busy OB-GYN practice, he would relax and enjoy a conversation with a fellow pilot about their various escapades. This was his escape from reality three times a week. His was a demanding occupation, and we were interrupted several times by the minutia of the daily practice of medicine, but through it all, he kept his smile and soldiered on with his stories while encouraging a dialogue.

To be honest, I could not even begin to counter his stories with any of mine. His were deliciously appetizing, kind of made you go into a dream mode, cryptic and satisfying. But through it all, in those twenty minutes of conversation, he would make sure to inquire about my aspirations in aviation. The examination was thorough, while he kept me involved with questions about the "dos and don'ts" of flying.

I passed my medical without a hitch and from then on, each time I left his office, I felt good about myself, aviation, and for being a physician. I wanted to be like him. I was already a physician, so that hurdle was crossed, but to become an aviation medical examiner—now that was going to be challenging.

After an initial inquiry with the FAA, I found out that of all the difficulties I faced, the biggest hurdle was... NEED.

On my fifth medical examination with my AME, I finally asked him how I could become an AME. He did not miss a beat and answered, "I have been waiting for this question for a while."

Oh really, I thought. What gives?

Turns out he was planning to retire from his practice and wished to submit a name to the FAA for his successor in the area. Well now, I thought, had I stepped into the fields of my desire by accident or was this a carefully crafted scenario to lure me in?

Turns out it was neither. It was a coincidence, and I was the recipient of the proverbial pot at the end of the rainbow. He had thought of me as a potential successor if I showed an interest. And now I had. What it took was an endorsement from him, and the FAA identified the need with a letter addressed to me. After a week in Oklahoma City, that was it—I had become an AME!

I have enjoyed this privilege, earning the respect of fellow pilots and getting to know a fair number of aviators. This is a select version of humanity: intelligent, gifted, desirous; a group that constantly strives to expand the envelope of knowledge and expertise.

From airline pilots to student pilots, all have a story to tell, especially the latter, whom I call the "innocents." They bring a blank slate where words, images and their meanings can be assimilated for the future. It is a delight to clear them medically (if they qualify) to face those challenges. One such twenty-something airline-captain-wannabe sat in my office one afternoon, all animated while extolling his desires in the field of aviation. However, his expression changed following the examination when I told him the grim truth about his testicular growth and the differential diagnoses. I shepherded him to the urologist for more fact-finding.

He showed up again in my office

two years later in complete remission after battling stage-II seminoma (cancer). He wanted to fly now more then ever, and his desire was to command a large commercial jet.

He had restarted his training with a local certificated flight instructor (CFI), and as he sat there on the edge of his seat, half out of breath describing his introductory flight, you could not but wonder at the blessings of fearlessness in his tone. At the end of his story, his eyes narrowed as he came up for air and asked if I could help him his get his medical certificate.

Absolutely, I would. After all, how could you not? Getting the Aviation Medical Examiner-Issued Special Issuance for a third-class student medical was easy. I told him to continue with his training, though, before deciding to expend resources and energy for higher goals. I would have to obtain the FAA's approval.

He walked out carrying a new student pilot certificate with an expanded chest and a proud smile of achievement. (He is currently working on his commercial pilot rating.) The joy of seeing him complete his goals has made me realize that helping someone achieve a dream is a reward devoutly to be cherished.

A psychiatrist colleague of mine happened to be in my office the same day and wistfully said that he would give anything to make a person that happy in such short a period of time. I told him, "Those are the perks of this trade, but it takes effort and commitment."

"True," he said, "but I would love to be in your shoes."

"Commitment and effort." I reversed the word flow.

Then, he asked, "How do I become an AME?"

Had I done it? Become one like my former AME? I don't know, but it felt good to be asked that question. Man, did it feel good.

Embodying my former AME's passion has allowed me the discourse of this vocation. Now I am able to assist others in achieving their desires as, years ago, he had fueled mine.

Our vocation is a privilege with great rewards beyond all material wealth and prestige. It rests upon the wings of passion.

Dr. Parvez Dara earned his wings in 1992 and became an aviation medical examiner in 2000.

This article originally appeared in The Federal Air Surgeon's Medical Bulletin.

New VA/FAA Program Expands Opportunities for Our Nation's Heroes

Veterans with disabilities will have access to on-the-job training to become air traffic controllers or technicians installing and repairing air traffic equipment, thanks to a new program aimed at helping those who serve transition into the civilian workforce.

The unveiling of the program took place at an event on Capitol Hill attended by Sen. Daniel K. Inouye, D-HI, a leader on veterans' issues, and Department of Veterans Affairs (VA) Undersecretary for Benefits, Admiral Daniel L. Cooper.

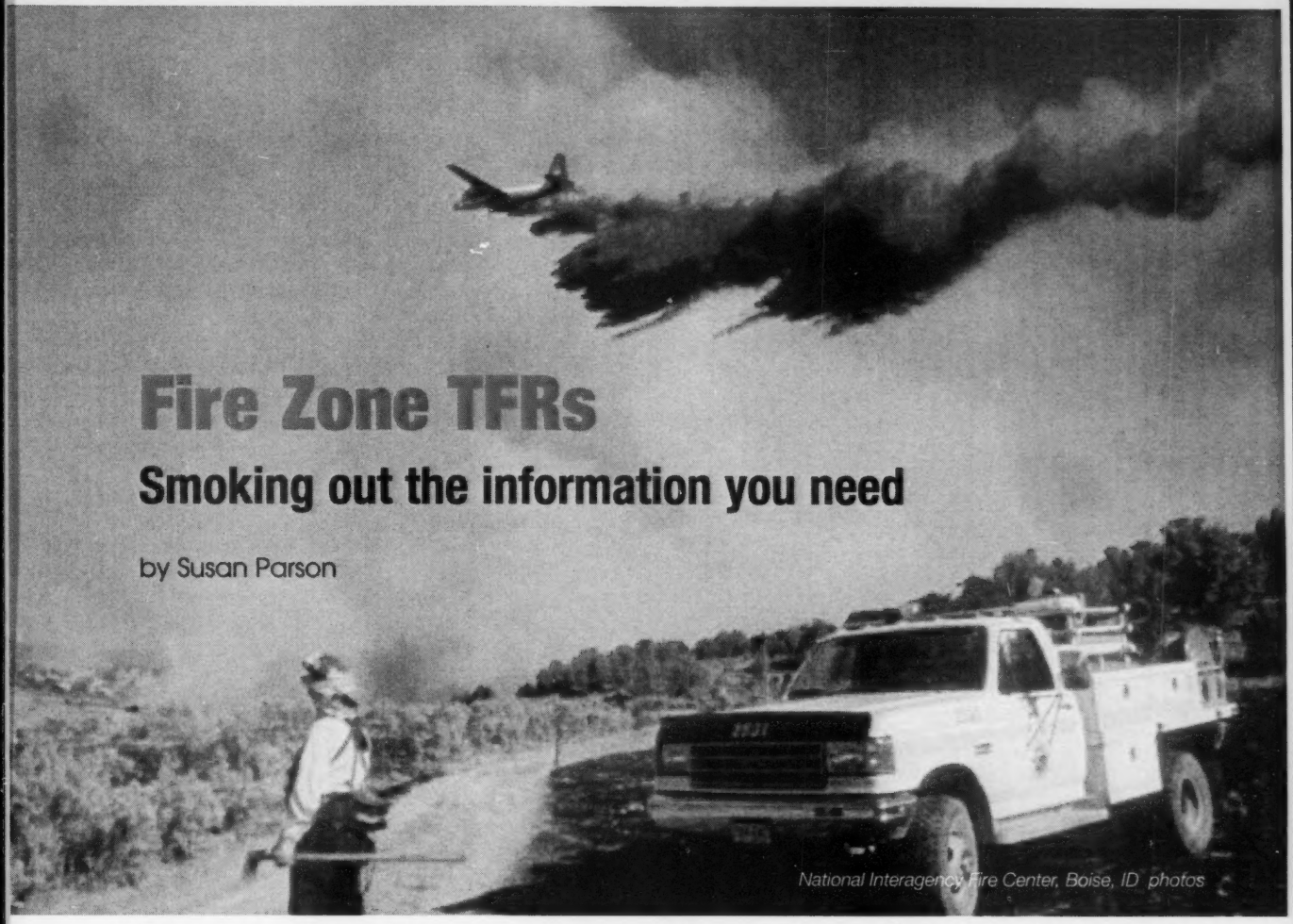
Called "A Hero to the Nation – A Hero to the Skies," this joint effort between the agency and the Department of Veterans Affairs (VA) will enable veterans to take advantage of VA vocational rehabilitation benefits, while training for air traffic control and airway transportation systems specialist positions. VA's Vocational Rehabilitation and Employment (VR&E) Program provides a transition for veterans with disabilities into the civilian workforce through on-the-job-training programs administered by FAA.

"America is indeed the land of opportunity, and we as a nation are compelled to give our veterans with disabilities every chance to prosper," said FAA Administrator Marion C. Blakey. "These heroes deserve no less."

Veterans will be trained at the FAA's Academy in Oklahoma City, OK, and will complete the same training requirements as other employees in similar positions. After successfully completing the program, they will be eligible for an FAA appointment and will enter the selection process. As an added benefit, FAA officials expect the program will contribute significantly to the agency's air traffic controller hiring goals, and will help attain the goal of long-term career placement for veterans.

"Veterans make ideal employees — and they are deserving of every opportunity we can provide," said Secretary of Veterans Affairs Jim Nicholson, a Vietnam veteran. "The skills and disciplines learned in the military, coupled with their dedication and maturity, make them an asset to any employer. I'm pleased to join with Administrator Blakey and the FAA in enhancing the post-military career prospects for our nation's defenders."

Veterans with disabilities interested in the program must apply through the VA's Vocational Rehabilitation and Employment (VR&E) offices located in each state. Information on the VR&E program can be found at <www.vetsuccess.gov>.



Fire Zone TFRs

Smoking out the information you need

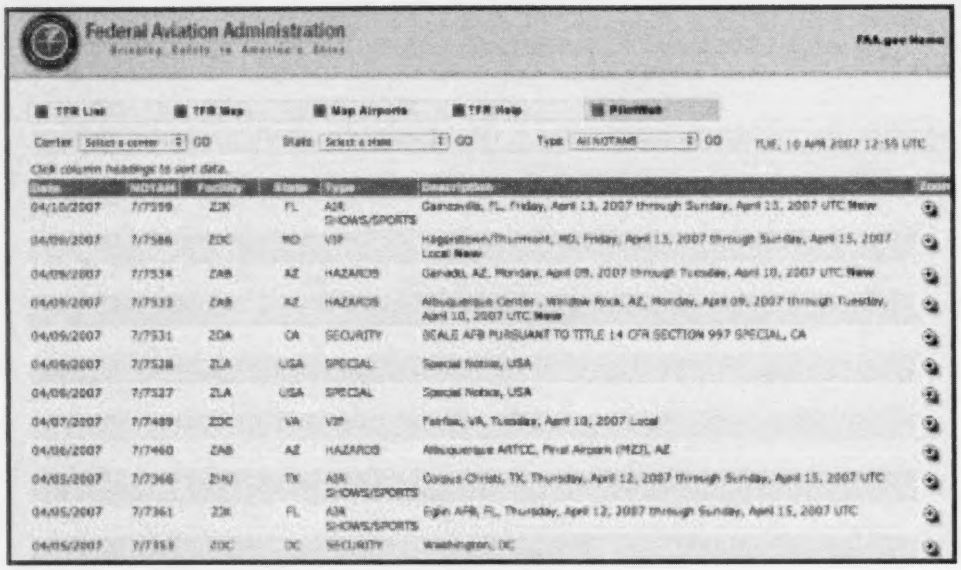
by Susan Parson

National Interagency Fire Center, Boise, ID photos

With good reason, there has been a lot of attention focused on increasing pilot awareness of security-related Temporary Flight Restrictions (TFR). As the fire season approaches, though, it is also important for pilots to be aware of TFRs established in the vicinity of wildfires. As outlined in Title 14 Code of Federal Regulations (14 CFR) section 91.137, which provides for TFRs "in the vicinity of disaster/hazard areas, the FAA may issue a *Notice to Airmen* (NOTAM) establishing such restrictions in order to:

- Protect persons and property on the surface or in the air from a hazard associated with an incident on the surface (e.g., a wildfire);
- Provide a safe environment for the operation of disaster relief aircraft (e.g., firefighting aircraft); or
- Prevent unsafe congestion of sightseeing and other aircraft above an area that may generate a high degree of public interest.

As you know, the regulations (14 CFR section 91.103) require you to become familiar with "all available information" concerning a flight you intend to operate. So how do you learn about fire zone TFRs? Of course, you should be sure to ask for any and all TFR information when you contact



This is the FAA Web site that has all the graphic TFRs. It is found at: http://tfr.faa.gov/tfr2/list.html. The Bureau of Land Management Web site, pictured below, can be found at: http://www.blm.gov/nifc/st/en/prog/fire/Aviation.html

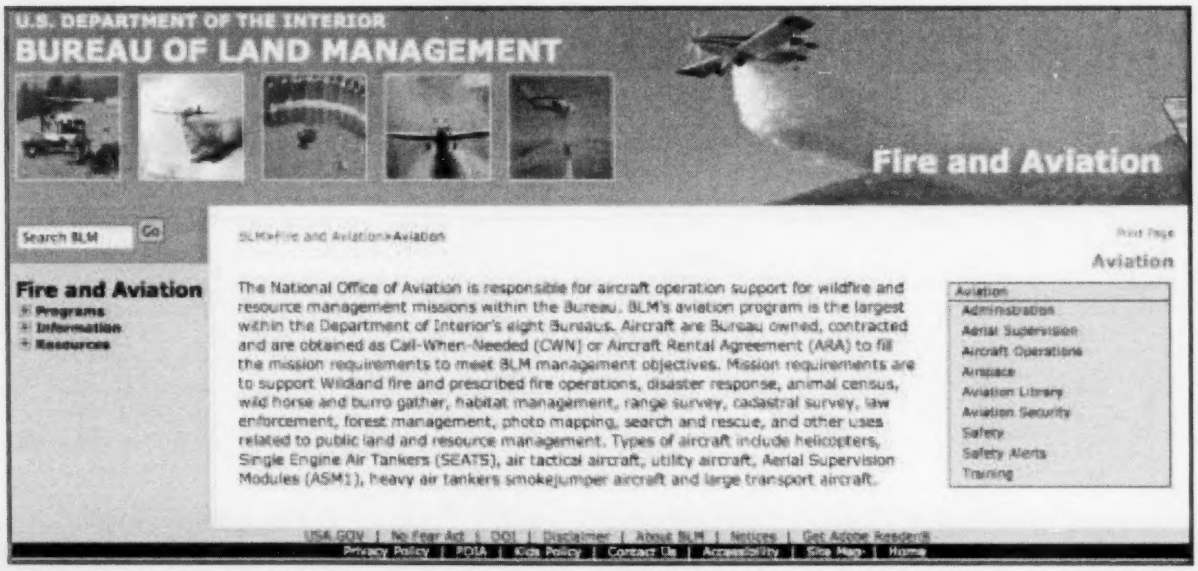
Flight Service or access Direct User Access Terminal System (DUATS) for your official preflight briefing. Thanks to the Internet, though, there are now several additional resources—including graphical TFRs—that you can use to supplement and better understand the information you receive by phone or computer briefing. Let's take a look.

FAA Web Site TFR Page

TFRs must be very precisely delineated and described in the NOTAM. Ironically, however, the high level of detail needed for precise text can make it very difficult for pilots to "see" and understand the location of the affected area. For this reason, the FAA created a Web site at <http://tfr.faa.gov/tfr2/list.html> that allows pilots to read the dimensions in both "plain English" and the original NOTAM text and, most importantly, to see the TFR depicted on a chart. As the site clearly states, remember that depicted TFR data may not be a complete listing and that you should call your local Flight Service Station at 1-800-WX-BRIEF for the most recent information.

National Interagency Airspace Information Web Site

A second resource is the National Interagency Airspace Information Web site (NIAIW), which is available at <http://airspace.nifc.gov>. Developed and operated by the Bureau of Land Management, the National Interagency Airspace Information Web site includes the National Parks Service, the Fish and Wildlife Service, and the


U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Fire and Aviation
Search BLM
Go
Fire and Aviation
Programs
Information
Resources
The National Office of Aviation is responsible for aircraft operation support for wildfire and resource management missions within the Bureau. BLM's aviation program is the largest within the Department of Interior's eight Bureaus. Aircraft are Bureau owned, contracted and are obtained as Call-When-Needed (CWN) or Aircraft Rental Agreement (ARA) to fill the mission requirements to meet BLM management objectives. Mission requirements are to support Wildland fire and prescribed fire operations, disaster response, animal census, wild horse and burro gather, habitat management, range survey, cadastral survey, law enforcement, forest management, photo mapping, search and rescue, and other uses related to public land and resource management. Types of aircraft include helicopters, Single Engine Air Tankers (SEATS), air tactical aircraft, utility aircraft, Aerial Supervision Modules (ASM1), heavy air tankers smokejumper aircraft and large transport aircraft.
Aviation
Administration
Aerial Supervision
Aircraft Operations
Airspace
Aviation Library
Aviation Security
Safety
Safety Alerts
Training
USA.GOV | No Fear Act | DOI | Disclaimer | About BLM | Notices | Get Adobe Reader
Privacy Policy | FOIA | Kids Policy | Contact Us | Accessibility | Site Map | Home

Bureau of Indian Affairs. The goal of this Web site is to give all aviation users—both pilots and firefighters—easy online access to interactive aviation charts that show TFRs are issued because of the low-level, dense operations of aircraft in a fire zone. As with the FAA's TFR Web site, the NIAIW stresses that pilots must check the text-based NOTAMs for the most current and accurate information. Its stated goal, however, is to offer graphical TFR updates within 30 minutes of their being issued during business hours (Monday through Friday, 7 a.m. to 4 p.m. Mountain) and twice daily during fire season (7 a.m. and 1 p.m. Mountain) on weekends and holidays. The site updates NOTAM text every 12 minutes.

In addition to providing access to graphical and text information on TFRs related to firefighting operations, the NIAIW site also displays security-related TFRs (in red); stadium TFRs (in green); laser light activity NOTAMs (in purple); and TFRs related to nuclear sites (with a black and yellow icon). Clicking on each symbol brings up additional details about the affected area. Additional features include flight planning, airspace management tools (for members who have login access to post information on the site); fire maps; contacts; and links.

Another Web site dedicated to airspace issues involving U.S.Department of Agriculture/Forest Service and the Bureau of Land Management (Pacific Northwest Region) is the Interagency Airspace Coordination at <http://www.fs.fed. us/r6/fire/aviation/airspace>. It contains useful links, with descriptions, to FAA, military, state and private organization Web sites.

Check it out, and fly safely! And don't forget to report a fire if you spot one.

Susan Parson is a Special Assistant in Flight Standards Service's General Aviation and Commercial Division.

National Interagency Fire Center, Boise, ID photos

• Weighty Matter

The article in the March/April 2007 issue titled "The Anatomy of a 'Warbird' Type Rating, Part 1" contains an apparent mistake. The second paragraph of the article on page 26 lists a reference weight of 2,500 pounds for a large aircraft. Shouldn't the weight for large aircraft be more than 12,500 pounds?

Name withheld by request.

You are correct. The weight should be more than 12,500 pounds rather than the 2,500 pounds listed. We lost the "1" during production.

• March/April's Back Cover

Editor's Note: In our last issue, we ran a photo on the back cover and asked if anyone could identify the airplane. Here are the responses we got this time.

Gretta Thorwarth photo

I just received the March/April *FAA Aviation News*. The back cover appears to be a scale model of a Curtis P-12.

Bob Castle
via the Internet

The photo on the back cover is a Curtis *Hawk* P-6E

Chet Piolunek
Baltimore FSDO

I believe that the aircraft in the photo is a radio controlled model of a Curtiss P-6E. The aileron servos under the upper wings and the relative size of the propeller blade give it away. The top surface of the bottom wing looks too smooth and lacks the signs of rib stitching. However, the absence of a young woman bearing a bathing suit posing with or near the model lends some authenticity to the photo.

Randy Wilde
Los Altos, CA

We want to thank everyone who submitted comments about the photo. The following information was provided on the aircraft. It is a radio control Curtiss P-6E Hawk *assembled from a Great Planes® kit and is built on a 1/5 scale. It has a wing span of 76 inches and a O.S. .91 IIS-P four-stroke engine.*

The other interesting fact about this photo was that it was taken by Gretta Thorwarth from Glen Burnie, MD., who is 11 years old. Great photo, Gretta.

• Weatherwise CD

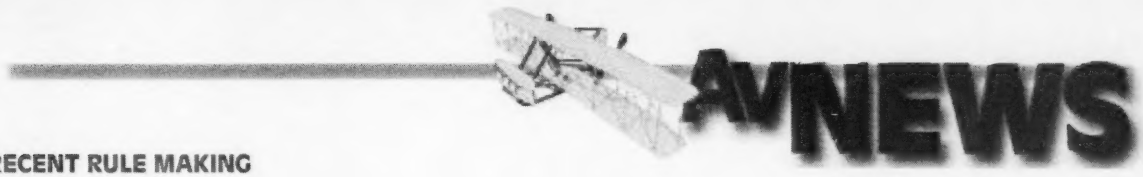
In the March/April issue, the News page mentioned the CD, "Weather Wise: Thunderstorms and ATC," would be distributed to all IFR pilots. Has it been distributed? I haven't gotten my copy yet.

Via the Internet

Yes, distribution has started and you should receive your copy soon. If you don't receive a copy, the course is available online from the AOPA/Air Safety Foundation at <http://www.aopa.org/asf/online_courses/?pl=ICOCTXT>.

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to H. Dean Chamberlain, Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463; e-mail address:

Dean.Chamberlain@faa.gov



RECENT RULE MAKING

Proposed Revision of Airworthiness Standards for Propellers

In the April 11, 2007, *Federal Register* the FAA proposed a revision to the airworthiness standards for the issuance of original and amended type certificates for airplane propellers. The existing propeller requirements do not adequately address the technological advances of the past twenty years. The proposed standards would address the current advances in technology and would harmonize FAA and European Aviation Safety Agency (EASA) propeller certification requirements, thereby simplifying airworthiness approvals for imports and exports. Comments must be received on or before June 11, 2007.

Changes to Certain Light Sport Aircraft Definitions

This action appeared in the April 19, 2007, *Federal Register*, and corrects an unintended consequence created when the FAA adopted the original Light-Sport Aircraft (LSA) Rule. We did not have sufficient information when the original rule was adopted to foresee this difficulty. Since then, the FAA has been working with the LSA industry in evaluating the overall LSA program. This action amends the definition of an LSA in two areas. The changes will (1) permit development of lighter-than-air (LTA) LSA, and (2) allow retractable landing gear for LSA intended for operation on water. The LTA change will result in a common land-based LSA maximum takeoff weight limit and allow the LTA LSA industry to design and build safe, functional LTA aircraft. Allowing retractable landing gear for LSA intended for operation on water recognizes the realities of the operation of these LSA and will also enhance the growth of that industry. The effective date of this action is June 4, 2007.

For more information on these and other FAA rulemaking documents, visit the FAA Web site at <http://www.faa.gov/regulations_policies/rulemaking/recently_published/ >.

CHANGE IN NASDAC PROGRAM AND DOMAIN

The services, functions and responsibilities of the National Aviation Safety Data Analysis Center (NASDAC) have been refocused and integrated into the Aviation Safety Information Analysis and Sharing (ASIAS) program. This necessitated changing the program's Internet address from <www.nasdac.faa.gov> to <www.asias.faa.gov>. Users, who click on the old NASDAC URL, will be automatically redirected to the new ASIAS URL.

NTSB STATISTICS SHOW IMPROVEMENT IN AVIATION SAFETY

The state of civil aviation safety continued to improve in 2006 according to statistics released by the National Transportation Safety Board (NTSB). The number of accidents in all segments of civil aviation in 2006 were less than in 2005, with general aviation recording the lowest number of accidents and fatal accidents in the 40 years of NTSB record keeping.

"This is very good news," said NTSB Chairman Mark V. Rosenker, "but it is no reason to let down our guard. We need to build on this improving record with a continued emphasis on safety in all phases of aviation."

Major air carriers who operate larger aircraft and carry passengers and cargo between major airports continued to have the lowest accident rates in civil aviation. These commercial carriers, who are officially classified by Federal regulations as operating under Title 14 Code of Federal Regulations part 121, carried 750 million passengers more than eight billion miles while logging more than 19 million flight hours in 2006.

At the same time, these carriers had 31 accidents, down more than 20 percent from 2005. Only two of the 31 accidents were fatal, resulting in 50 fatalities.

Over the years, the number of major air carrier accidents has increased, primarily due to a substantial increase in flight activity. The number of flight hours logged by air carriers has almost doubled since 1987 and the number of departures has increased by 50 percent. Major air carriers experienced in 2006, on average, only one accident every 266 million miles, 630,000 hours flown, or 368,000 departures. Fatal accidents are rare events, occurring only .01 accidents per 100,000 flight hours or .018 accidents per 100,000 departures.

On-demand Part 135 operations that include air taxi, air tour, and air medical operations experienced more accidents than major air carrier operations. These operations typically use much smaller aircraft, including helicopters, and can service smaller airports. In 2006, on-demand part 135 operators had 54 accidents, down almost 20 percent from 2005, with 10 of those accidents resulting in 16 fatalities. These air carriers flew more than 3.6 million flight hours in 2006, and recorded 1.5 accidents and .28 fatal accidents for every 100,000 hours flown. The number of on-demand Part 135 accidents has been steadily decreasing over the past 10 years, while the hours flown by these air carriers has steadily increased, producing a general downward pattern in accident and fatal accident rates.

Commuter operations (officially described as scheduled Part 135 operators) show a similar pattern to on-demand Part 135 air carriers, but ac-

count for a very small proportion of the accidents and flight activity. In 2006, commuter operators experienced only three accidents, one of them fatal, resulting in two fatalities. However, these operations account for only 1% of air carrier flight hours, resulting in 1.1 accidents and .36 fatal accidents per 100,000 hours flown. These rates are comparable to on-demand part 135 operations.

The decline in General Aviation accidents in 2006 continues an ongoing trend. General Aviation accounted for the greatest number of civil aviation accidents and fatal accidents in 2006; a total of 1,515 accidents, 303 of them fatal, resulted in 698 fatalities. Although General Aviation accounts for half of all civil aviation flight hour activity, it produces the highest accident and fatal accident rates. Part of the decline in the number of General Aviation accidents was due to a steady decrease in the amount of flight activity. Since 1990, General Aviation hours flown has declined 20 percent, and as a consequence, the General Aviation accident rate stayed relatively stable in that period, averaging approximately 7.5 accidents per 100,000 flight hours.

The 2006 statistical tables are available at <www.ntsb.gov/aviation/Stats.htm>

NTSB IS 40

The National Transportation Safety Board (NTSB) opened its doors April 1, 1967. On that day, the Bureau of Safety was removed from the Civil Aeronautics Board and became the foundation for the new accident investigation agency. Since then, the NTSB has investigated about 130,000 aviation accidents and thousands of accidents in the other modes of transportation: highway, rail, marine and pipeline.

"I have often said that the NTSB is one of the best bargains in government," NTSB Chairman Mark V. Rosenker said. "With fewer than 400 employees, the Safety Board is responsible for investigating more than two thousand transportation accidents a year. In our 40 years, our independent investigations have played an important part in improving the safety of every mode of transportation. As a result of the efforts of the Safety Board and other government agencies, manufacturers, operators and stakeholders, the United States enjoys a safe transportation system that is the envy of the world."

The NTSB is an independent Federal agency charged with investigating every civil aviation accident in the United States and major accidents in the other modes of transportation. It is not a regulatory agency; its major product is the safety recommendation, each of which represents a potential safety improvement. In its 40 years, the NTSB has issued some 12,600 safety recommendations, with an average acceptance rate of 82 percent.

The transportation system has seen many changes since the mid-1960s and experienced substantial growth. The safety of those systems also has increased dramatically, as two of the major modes illustrate.

Aviation safety has improved, in part, because investigations now feature digital flight recorders with many hundreds of parameters, where foil recorders 40 years ago provided only five parameters and had to be read out by hand. Equipment or operational problems can now be more readily and confidently identified. Turbine engines are so reliable that twin-engine aircraft are now allowed to fly for thousands of miles over open water. Computers have led to the development of extremely realistic flight simulators, allowing pilots to be trained to handle virtually any conceivable flight condition. Systems developed and installed on airliners—resulting at least in part from NTSB recommendations—have virtually eliminated mid-air collisions and controlled flight into terrain crashes in this country for aircraft so equipped.

If the air carrier accident rate were the same today as it was in 1965, the United States would average a fatal airliner accident every 10 days. Except for the terrorist attacks of 2001—which were deliberate criminal acts—no year since 1990 has seen more than 4 fatal scheduled air carrier accidents in the United States. The annual number of general aviation crashes has dropped by two thirds in the last 40 years.

Highway safety has improved dramatically in that period of time as well. Although the number of highway fatalities has fallen only 17 percent in the last 35 years, the extremely large increase in miles driven has resulted in a drop in the fatality rate of about 70 percent. "We have made great strides in the last 40 years in improving highway safety through the broad acceptance of seat belts and realization that drunk driving cannot be tolerated by our society," Chairman Rosenker said, "but we still lose over 43,000 of our fellow citizens every year on the roadways and this must be stopped."

While acknowledging some long-term safety challenges the NTSB continues to address – like operator fatigue and railroad anti-collision systems—Rosenker applauded the work of those who have staffed the Safety Board over the decades. "I am confident that in the years to come the National Transportation Safety Board will continue to be at the forefront of identifying safety problems in the transportation system and recommending changes to eliminate them. I think our nation has been well-served by the career professionals who comprise the dedicated workforce of the NTSB. I congratulate them and all who have come before them over the last 40 years."

Editor's Runway

from the pen of H. Dean Chamberlain

Time To Share

As this publication has been pointing out recently, the summer flying season has begun. From air shows to fly-ins to fly-in pancake breakfasts to the quintessential aviator's meal, the $100 hamburger, now is the time to fly to your favorite aviation spot. One way to make that $100 hamburger a little easier to swallow is to share the cost of the flight. The good news is Title 14 Code of Federal Regulations (14 CFR), Aeronautics and Space, which contains the regulations for aviation, permits pilots to share certain flight costs with their passengers, even though such sharing would constitute compensation, if the following rules did not provide exceptions to the prohibition concerning compensation. The rules specify under what conditions a pilot can share the cost, in what type aircraft, and how to avoid violating other rules that apply to commercial operators such as air taxi operators. Please note all of the following rules derive from 14 CFR. The best description concerning the exception to the compensation rule is contained in the private pilot regulation.

If you are a student pilot, you can't share expenses. The reason is student pilots are prohibited from carrying passengers. The applicable rule states in 14 CFR section 61.89, General limitations, subpart (a) "A student pilot may not act as pilot in command of an aircraft (1) That is carrying a passenger."

If you are a private pilot, 14 CFR section 61.113, Private pilot privileges and limitations: Pilot in command, states in subsection (c) "A private pilot may not pay less than the pro rata share of the operating expenses of a flight with passengers, provided the expenses involve only fuel, oil, airport expenditures, or rental fees."

If you are a recreational pilot, 14 CFR section 61.101 applies to you. Recreational pilot privileges and limitations, subsection (a)(2) says, "Not pay less than the pro rata share of the operating expenses of a flight with a passenger, provided the expenses involve only fuel, oil, airport expenses, or aircraft rental fees."

If you are a sport pilot, the applicable 14 CFR section is 61.315, What are the privileges and limits of my sport pilot certificate, which in subsection (b) states, "You may share the operating expenses of a flight with a passenger, provided the expenses involve only fuel, oil, airport expenses, or aircraft rental fees. You must pay at least half the operating expenses of the flight."

The keys issues here are the specific types of expenses that can be shared and the ratio the pilot is expected to pay to comply with the exception in the rules.

What some private, recreational, and sport pilots may forget and must avoid is the appearance of receiving unacceptable compensation. For example, as noted above, private, recreational, and sport pilots may share the cost of certain flight expenses, but they must meet the correct ratio. Anything less can be construed by the FAA as compensation to the pilot for the flight, because the pilot failed to meet the requirements outlined in the exception listed in each rule.

Another situation a pilot must avoid is the appearance of holding out to the public air transportation. That point is best explained by saying the flight must be one the pilot decides to make regardless of taking any passengers. Once the pilot decides to take the flight, he or she can ask if anyone wants to go along and share the cost. What the pilot must avoid is saying to potential passengers that if they want to go to point A, he or she will fly them there and share the costs. FAA considers this as holding out air transportation to the public for compensation or hire.

The underlying issue in this discussion is the concept of "For Commercial Purposes." The FAA has taken the position that the term means "for compensation or hire." This may include either direct or indirect payment for the operation. This interpretation does not mean there has to be a profit made. For example, logging of flight time has been determined to be a form of compensation. That is why it is important that non-commercial pilots meet their respective rules for sharing the designated flight costs. A pilot's failure to meet those requirements may imply the flight was for compensation or hire.

Finally, the type of aircraft involved is important. Title 14 CFR section 91.319, Aircraft having experimental certificates: Operating limitations, states in subsection (a) "No person may operate an aircraft that has an experimental certificate—(2) Carrying persons or property for compensation or hire." That section does not provide for the sharing of costs like the other sections listed.

So as you plan your next flight to your favorite fly-in, hamburger joint, or vacation spot, and you are thinking about inviting and sharing the cost of the flight with your friends, make sure you are in compliance with the rules. When done right, that $100 hamburger flight may not be as expensive as you think.

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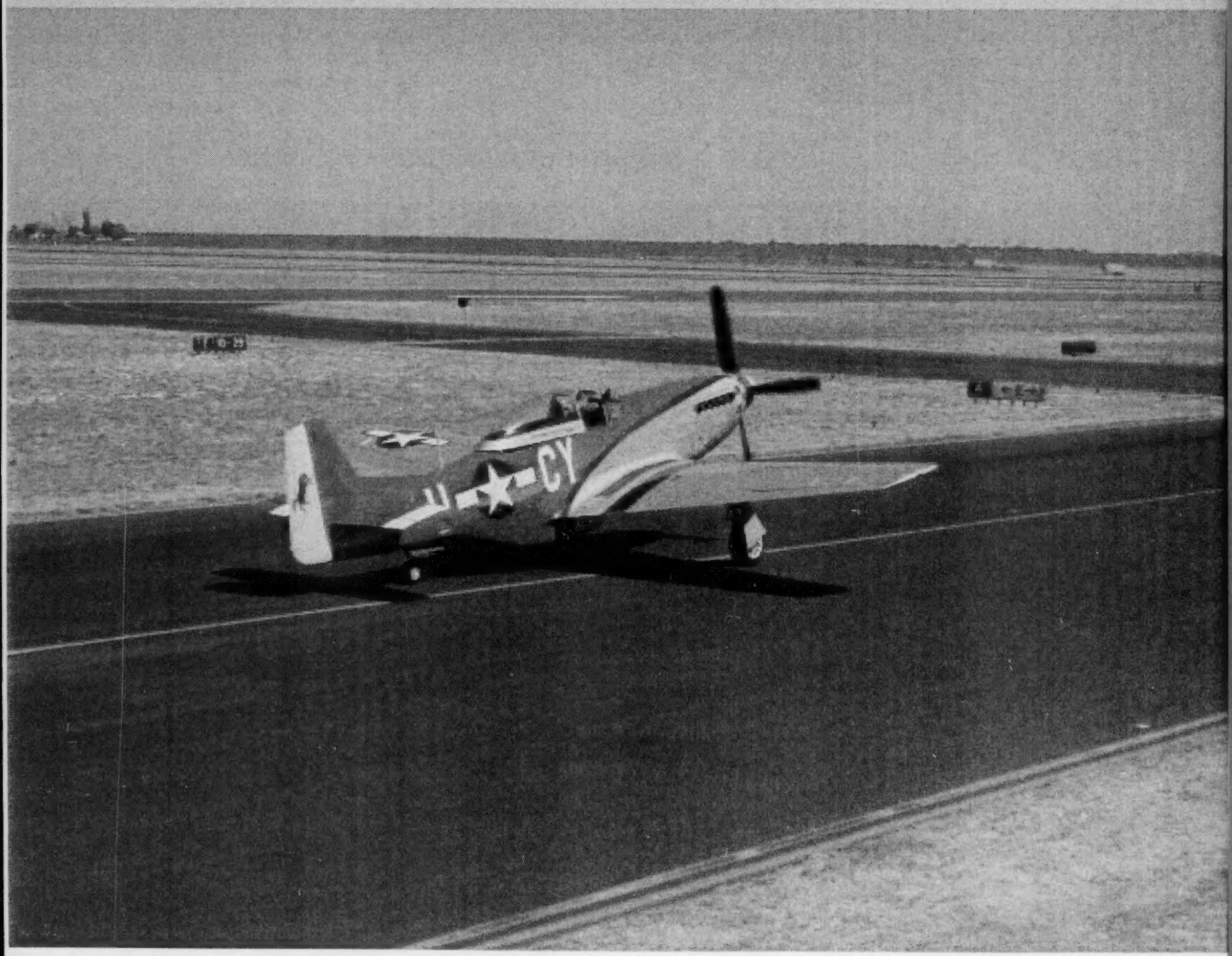
DO NOT DELAY -- CRITICAL TO FLIGHT SAFETY!